The Painesville Plant site is the location of a former processing plant located on a parcel of land approximately 35 acres in size. The site is is located in Painesville Township in Lake County, Ohio (R.8W., T.11N.). Most of the buildings on-site have been demolished and covered with clay from a nearby clay pit. The site is bordered by Lake Erie on the north and industrial areas on the other three sides. The site is located east of 1000 Second Street in Fairport Harbor, Ohio

The Painesville Plant site is currently owned by Maxus Energy Corporation, which purchased the site from Diamond Shamrock Chemical Company in 1986. The plant was originally built in 1914 as Diamond Alkali Company, which produced soda ash for Pennsylvania Plated Glass (PPG). PPG used the soda ash as part of their glass manufacturing process. During the mid 1960s a cement kiln was built on-site. A chlorine plant was also built on-site during the 1960s because of easy access to sodium chloride, a waste product of the soda ash plant. The chlorine plant produced chlorinated paraffins, used as an additive in the formation of polyvinyl chloride. The exact dates of operation for the cement kiln and chlorine plant are not known (Dugas 1990).

In 1967 Diamond Chemicals (formerly Diamond Alkali Company) and Shamrock Oil and Gas merged, forming Diamond Shamrock Chemical Company. Some of Diamond Chemicals's holdings were also sold to Oxidental Chemicals, although the Painesville Plant site was not included in the sale. In 1986, Maxus Energy Corporation bought out Diamond Shamrock Chemical Company. Shortly afterward the site was divided into parcels and some parcels were sold to Standard Machine Equipment (SME). At the time of purchase, SME was planning to demolish the buildings on-site and to salvage and sell the steel used in the buildings. Because of the collapse of the steel industry, these plans were put on hold. Eventually, though, SME and Maxus Energy Corporation agreed to demolish the buildings. According to Paul Dugas of Maxus Energy Corporation, at the time of demolition transformers containing oil with PCBs were discovered on-site. SME workers drained the transformers into drums, and removed the drums. The buildings were then demolished, and the steel was recovered and sold. The concrete foundation was then broken and the entire site covered with clay from a clay pit on nearby property. The cover was graded to drain toward Lake Erie. An unsuccessful attempt to vegetate the site was then made. Attempts are currently being made to successfully vegetate the site. No regulatory related actions have been taken at the site (Dugas 1990).

FOH0021XB

Review of state file information revealed that waste vater from the chromate facility and spent pickle liquors from local steel manufacturers were both deposited in Waste Basin #4 (see Figure 1 for areas of unknown contamination). File information also included allegations that Waste Basin #3 and the Retention Basin received some wastes from the chromate facility along with wastes from the chloro-alki, soda ash, coke and other on-site production facilities. File information does not include sample data taken from any of the above-mentioned areas. FIT will collect approximately 13 surface and subsurface soil samples from the aforementioned areas to determine the waste characteristics present at the Diamond site (see Figure 2 for soil sample locations).

FIT will be investigating Waste Basin #3, Waste Basin #4, and the Retention Basin. Waste Basin #3 and the Retention Basin received some wastes from the chromate facility along with wastes from the chloro-alki, soda ash, coke and other on-site production facilities, Waste Basin #4 received waste wate from the chromate facility and spent pickle liquors from local steel manufacturers.

Job No. _____

TOD/PAR FOH0021XB

CHEMICAL HAZARD EVALUATION (Continued)

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
anthracene	0.2 mg/m³ PEL + TWA	INGESTION INHAL, DERM ABSORP.	SHORT OF BREATH IRR. EYES, SKIN, RESP, STOMACH PAINS	—	AROMATIC ODOR
fluoranthene	Fluorides 2.5 mg/m³	OCULAR SKIN, INGEST	NA	NA	NA
pyrene	NA	SKIN	SKIN IRR	NA	NA
benzo[a] anthracene					
benzo[b] fluoranthene					
benzo[k] fluoranthene					
benzo[a] pyrene	0.01/0.01 ppm	ING, EYE, DERMAL, SKIN INHALE	NASAL IRR. PHOTOSENSIT. PULMONARY EDEMA	—	FAINT AROMATIC
4,4' DDE					
4,4' DDT	1/1 mg/m³	ING, EYE, DERMAL, SKIN, INHAL	SEVERE VOMIT, APPREHENSION MUSCULAR TREM	0.35 ppm	FAINT AROMATIC
AROCLOR 1254	1/1 mg/m³	INHAL, EYE, SKIN, INGEST DERMAL	IRR SKIN, EYES, NOSE, VOMIT, FATIGUE	.0095 ppm	PLEASANT BUTTER-LIKE
Chrysene					
Heptadecane 2, 6-dimethyl					
Prometon (ACN)					
SODIUM CARBONATE		SKIN, EYE INGEST	SKIN, EYE IRRITANT	—	NONE
HYDROCHLORIC ACID	TLV 5 ppm	INHAL, EYES, SKIN, INGEST	COUGH, CHOKING SENS. IRRIT. NOSE	1-5 ppm	PUNGENT SHARP IRRITATING
CHROMIUM TRIOXIDE	1 mg/m³ OSHA std	INHAL, EYES, SKIN, INGEST	NOSE, + THROAT	—	NONE
SULFURIC ACID	1/1 mg/m³	INGEST, SKIN, INHAL, DERMAL EYES	BURNS EYES, THROAT, SKIN COUGH NAUSEA	0.25 ppm	Sulfuric

TDD/PAR FO4000210

CHEMICAL HAZARD EVALUATION (Continued)

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
Asbestos	~~ceiling~~ PEL 0.2 fibers/cc	INGEST INHALE	SNEEZING IRRIT NOSE + EYES	—	NONE
antimony	0.5 mg/m³ TLV	AIR; INHALE, INGEST, EYES	RESP INFLAMM VOMITING, SLOW PULSE	—	NONE
arsenic	0.1/0.2 mg/m³	ING, EYE, DERMAL, SKIN INHAL	NOSE IRR, HEADACHE, DIZZY FATIGUE, CONVULSIONS	—	NONE
barium	none/0.5 mg/m³	ING, EYE, SKIN, INHALE	VOMITING, DIARRHEA, IRR EYES, NOSE	—	—
beryllium	TLV .002 mg/m³	INHAL, ING, EYE SKIN	COUGHING, SHORTNESS OF BREATH, ACUTE LUNG DISEASE, INFLAMM OF EYES DERMATITIS	NONE	NONE
cadmium	.04/.01 ppm	ING, INHAL, SKIN ABSOR.	NAUSEA, HEADACHE, DIARRHEA, LEG PAIN	—	—
vanadium	0.05 MG/m³ TLV	INHAL	RESPITORY IRRITANT	NA	NA
chromium	.47/.23 ppm	ING, EYE, SKIN, INHAL	IRR EYES, NASAL, CONTACT DERMATITIS	—	NONE
cobalt	0.05/0.05 mg/m³	ING, SKIN INHAL	IRR RESP., SKIN, VOMIT, PAIN, CONVULS	—	NONE
copper	.38/.38 ppm	ING, EYE, INHALE, SKIN	SKIN, EYE, + NASAL IRR	—	NONE
selenium trioxide	TLV 0.2 mg/m³	INHALE, INGEST, EYE SKIN	NAUSEA, PALLOR, NERVOUS IRR EYES + SKIN	—	NA
lead	50 µg/m³ .01 ppm	ingest, eye, skin, inhale	vomit, diarrea, stomach dis.	—	NONE
Thallium Sulfate	TLV 0.1 mg/m³	skin, eyes, inhale, ingest	pain, numbness fever, loss of hair	—	NONE
manganese TLV	5 mg/m³	inhalation ingest.	sleepy, weak emotional dist. paralysis	—	NONE
nicked	0.41/0.41 ppm	ingest, eyes skin, inhale	irr skin, eyes, nasal, nausea, headache	—	NONE
Zinc OXIDE	10/10 ppm	ING, INHAL, SKIN ABS	IRR EYES, NASAL, SKIN	—	NONE
mercury	.05/.1 mg/m³	SKIN, INGEST, EYE, DERMAL, INHAL	HEADACHES COUGHING, SORE MOUTH	—	NONE

FOH00021XB

D. SITE SAFETY WORK PLAN

Site Control: Attach map, or sketch of site showing hot zone, contamination reduction, zone, etc.

Perimeter Identified? Yes [X] No [ ] Site secured? Yes [X] No [ ]

Work Areas Designated? Yes [X] No [ ] Zone(s) of Contamination Identified? Yes [ ] No [X]

Personnel Protection: TLD badges required for all field personnel.

Anticipated Level of Protection (Cross-reference task numbers to Section C):

	TASK DESCRIPTION	A	B	C	D
Task 1	Reconnaiss			←	X
Task 2	Soil Samp			←	X
Task 3	Sediment Smp			←	X
Task 4					
Task 5					
Task 6					
Task 7					
Task 8					

UPGRADE IF DRY OR DUSTY CONDITIONS OR IF MONITORING EQUIPMENT WARRANTS

* will be wearing Saranex

Modifications: Rad-Mini >0.1 mR/hr (alarm sounds) and/or Monitox readings >0 ppm, evacuate work zone and then call Health and Safety Staff.

Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions: CONTACT HEALTH AND SAFETY STAFF IF EVACUATION OCCURS.

- Level D: O_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates > NA mg/m³, other NA.
- Level C: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates > NA mg/m³, other NA.
- Level B: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates > NA mg/m³, other NA.
- Level A: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates > NA mg/m³, other NA.

Air Monitoring (daily calibration unless otherwise noted):

Contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling
CYANIDES	AREA	MONITOX OR DRAEGER	CONTINUOUS
ORGANICS	AREA	H NU	CONTINUOUS
RADIATION	AREA/PERSONAL	RAD-MINI TLD	CONTINUOUS

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:

All CONTAMINATATED EQUIPMENT WILL BE WASHED BEFORE AND AFTER USE IN ALCONOX SOLUTION AND TRIPLE RINSED WITH DISTILLED WATER. ALL WASH AND RINSE WATER WILL BE LEFT ON SITE WITH PRIOR PERMISSION OF THE SITE OWNER OR REPRESENTATIVE.

F0H0021X0

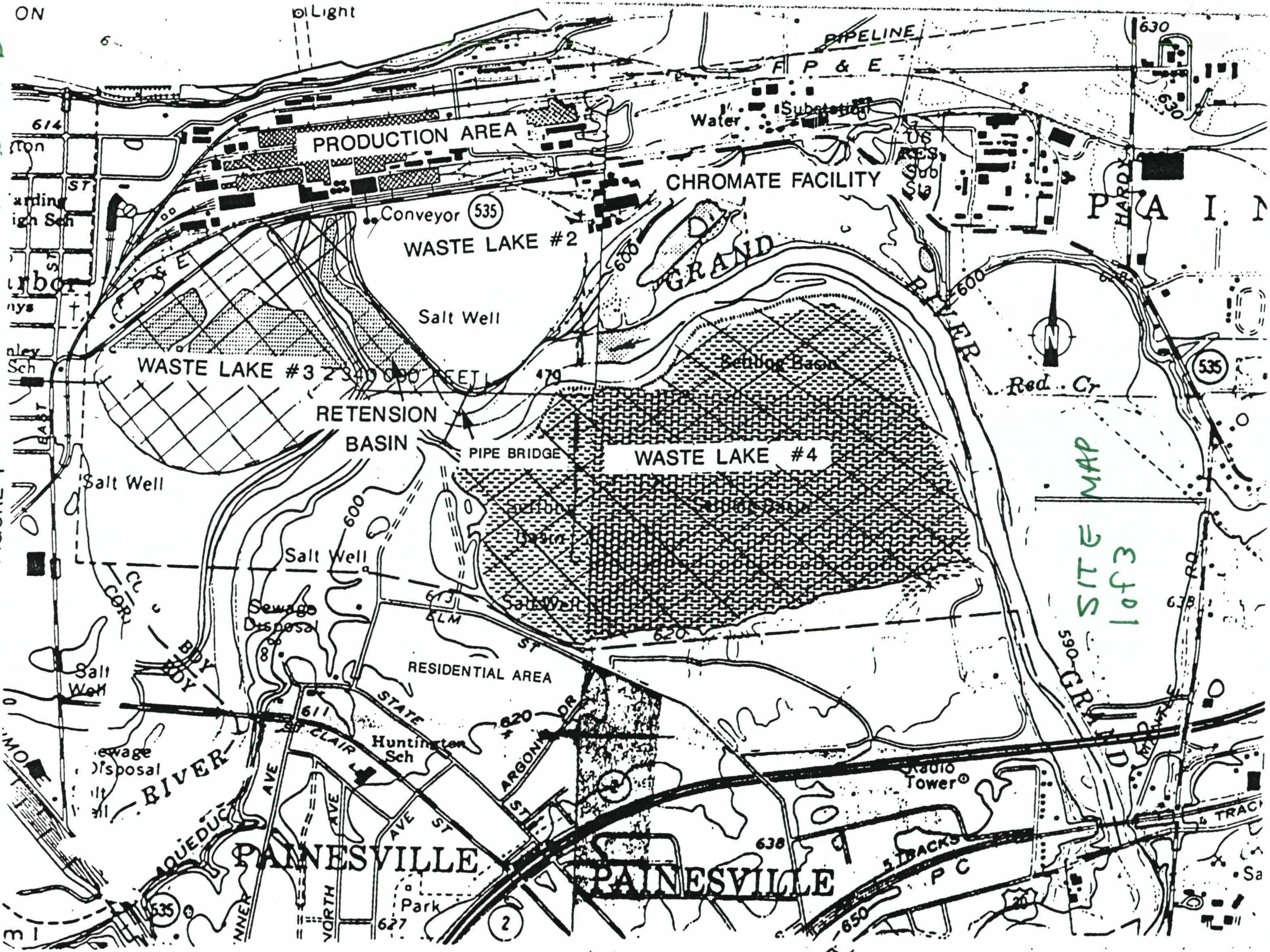
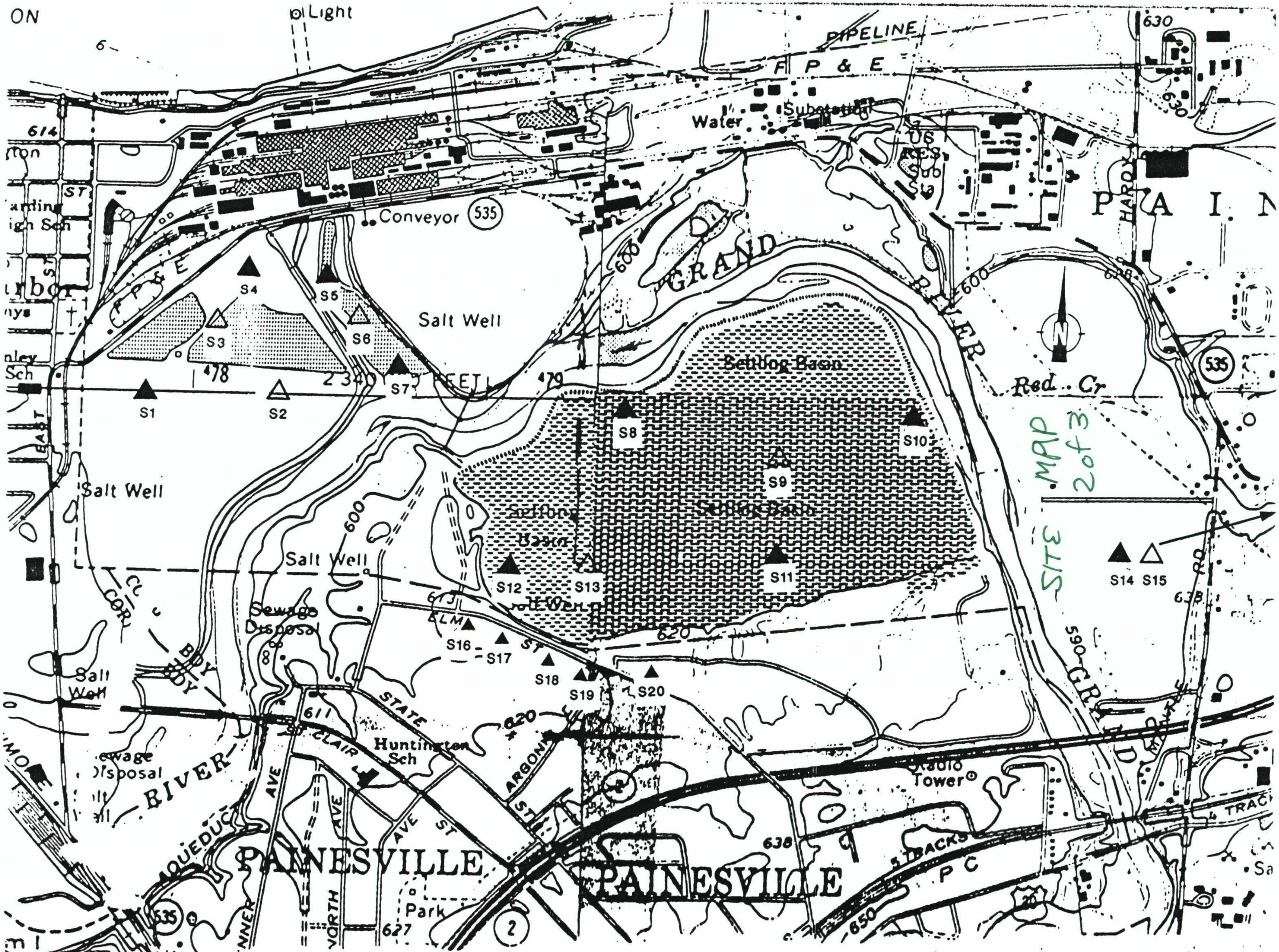


FIGURE 1

AREA OF POTENTIAL CONTAMINATION

SITE MAP
1 of 3

FIGURE 2



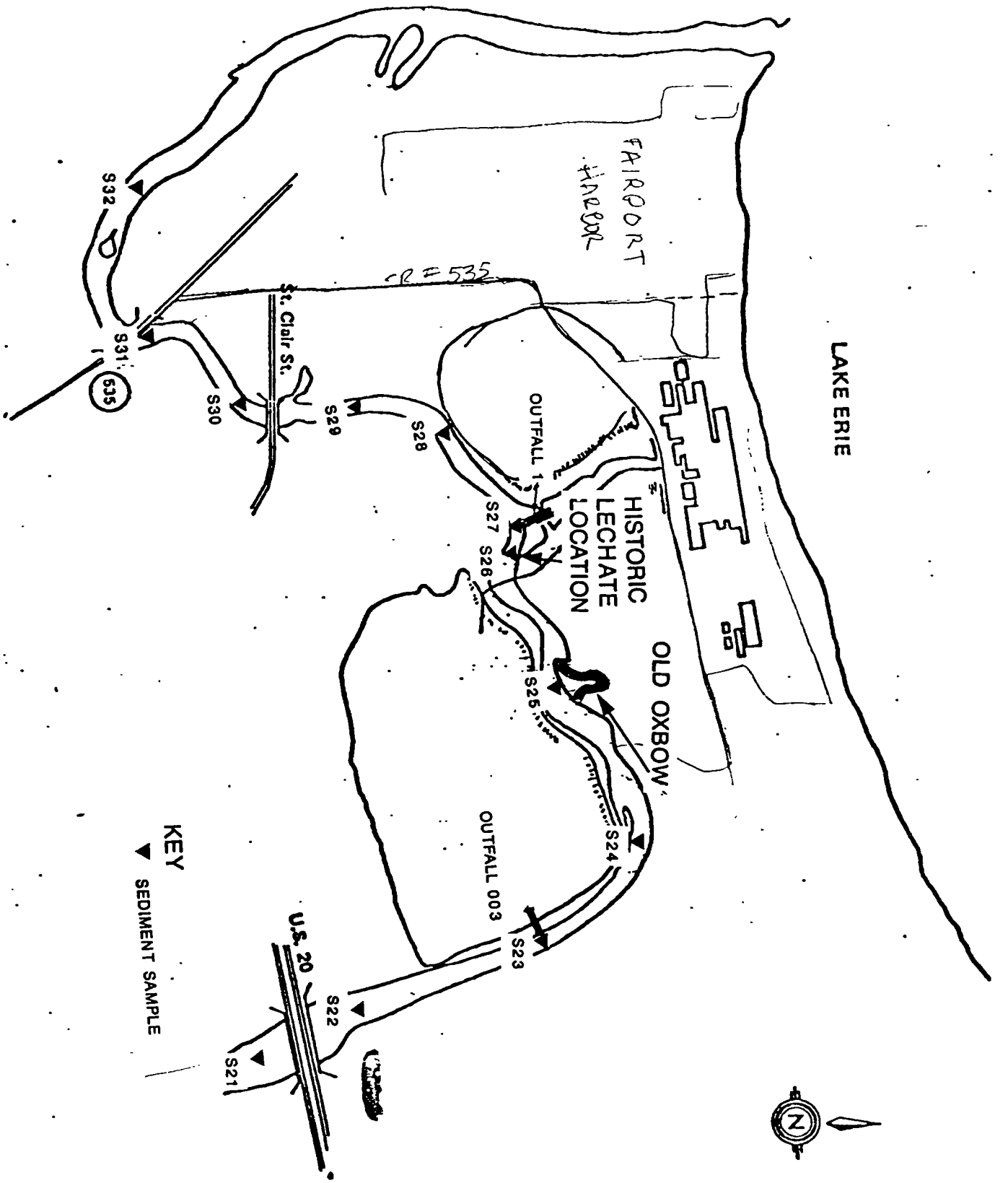
K

▲ REESIDENTIAL SOIL SAMPLE

▲ ON-SITE SURFACE SOIL SAMPLE

FIGURE 3

FOH0021XB



SITE MAP.
3 of 3.

FOH0021XB

Personnel Decon Protocol: A TWO WASH TUB SYSTEM WILL BE USED. THE FIRST TUB WILL BE USED TO DECONTAMINATE ALL CLOTHING WITH ALCONOX. THE SECOND WASH TUB WILL BE USED FOR RINSING WITH DISTILLED WATER

Decon Solution Monitoring Procedures, if Applicable: NA

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

OBEY SITE SAFETY REGULATIONS AT MINIMUM. TEAM LEADER WILL MAINTAIN LINE OF SIGHT AND ALSO SERVE AS BACK-UP. CONTINUOUS MONITORING WILL BE CONDUCTED FOR ALL SUBSURFACE SOILS SAMPLES

Site Entry Procedures and Special Considerations: Permission will be obtained prior to site entry. Stay upwind of contamination when possible. The buddy system will be maintained at all times.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:

Work is restricted to daylight hours only and workers are to be monitored for heat/cold stress.

When vermiculite is used to pack samples, dust masks will be worn.

General Spill Control, if applicable: NA

Investigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings):

Investigative-derived materials will be decontaminated in accordance with procedures listed above. The decontaminated material will be bagged and left on-site in appropriate waste containers with prior permission of site owner/operator.

Sample Handling Procedures Including Protective Wear:

After samples have been collected, the outside of the sample bottles will be decontaminated by washing (not submerging) the bottles in an Alconox solution and rinsing in distilled water. The protective clothing level (i.e. suits, gloves, boots) worn during on-site job activities will be maintained while decontaminating the bottles. Respiratory protection will be worn based on professional judgment. Latex gloves, at a minimum, will be worn, while handling the bottles after decontamination.

Team Member*	Responsibility
Jennelle Marcereau	Team Leader
Kerry Reyes	Site Safety Officer
NATHAN RUSSELL	SAMPLER
SALLY IMES	ASST SAMPLER
JAMES CHRISTENSEN	TM
MIKE PHILLIPS	CO TEAM LEADER

*All entries into exclusion zone require Buddy System use. All E & E field staff participate in medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

POH0021

E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary)

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance (216) 354-3579 Painesville Fire Department

Hospital Emergency Room (216) 354-2400 Lake County Memorial Hospit

Poison Control Center (216) 231-4455 Academy of Medicine, Cleveland Ohio

Police (include local, county sheriff, state) Painesville (216) 354-3535

County (216) 354-3434 State (216) 354-3233

Fire Department Painesville (216) 354-3579

Airport Cleveland OHIO AIRPORT (UNITED) 800-621-1551 After Hours 800-277-7559

Agency Contact (EPA, State, Local USCG, etc.) Jeanne Griffin (312) 886-3007

Local Laboratory N/A

UPS/Fed. Express 1-800-238-5355 Solun 5480 Naiman Pky 9-8

Client/EPA Contact Jeanne Griffin (312) 886-3007

Site Contact # Paul Dugas, Maxus Energy (216) 292-8226

#4 Joseph Berrick NESSEL LAND MANAGEMENT (216) 352-3916

SITE RESOURCES

Site Emergency Evacuation Alarm Method Verbal, Car horn

Water Supply Source FIT will supply its own water

Telephone Location, Number To be determined prior to site entry

Cellular Phone, if available NA

Radio NA

Other NA

EMERGENCY CONTACTS

1. Dr. Raymond Harbison (Univ. of Florida) ..... (501) 221-0465 or (904) 462-3277, 3281
   Alachua, Florida (501) 370-8263 (24 hours)

2. Ecology and Environment, Inc., Safety Director
   Paul Jonmaire ..... (716) 684-8060 (office)
   Non-responsive (home)

3. Laura D. Evans, Regional Safety Coordinator, Chicago .... (312) 663-9415 (office)
   Non-responsive (home)

4. Jerry Oskvarek, Office Manager, Chicago ..... Non-responsive (home)

5. Lou Adams, TAT Leader, Chicago ..... (312) 201-3790 (office)
   Non-responsive (home)

6. Tom Kouris, ATATL, Chicago ..... Non-responsive (home)

HS018A(01/16/91)

FOH0021 x B

MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "this is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   a. 24 hour hotline - (716) 684-8940
   b. Corporate Safety Director - Paul Jonmaire - home # Non-responsive
   c. Assistant Corp. Safety Officer - Steven Sherman - home # Non-responsive
   d. Chicago Health & Safety Manager - Laura Evans - home # Non-responsive

EMERGENCY ROUTES

(NOTE: Field Team must Know Route(s) Prior to Start of Work)

Directions to hospital (include map) Waste Lake #4 Exit site to Elm. Turn right onto Elm Street. Then left onto unnamed street. Turn right onto State St then left onto Skinner Ave to St. Clair St. to Washington Turn right on Washington 1 block to hospital

Emergency Egress Routes to Get Off-Site Exit site to Elm Street. Turn Right.

HS018A(06/11/90)

Waste Lake #3 - Exit site to 535 South west to St Clair St. to Washington. Turn right on Washington. 1 block to hospital.

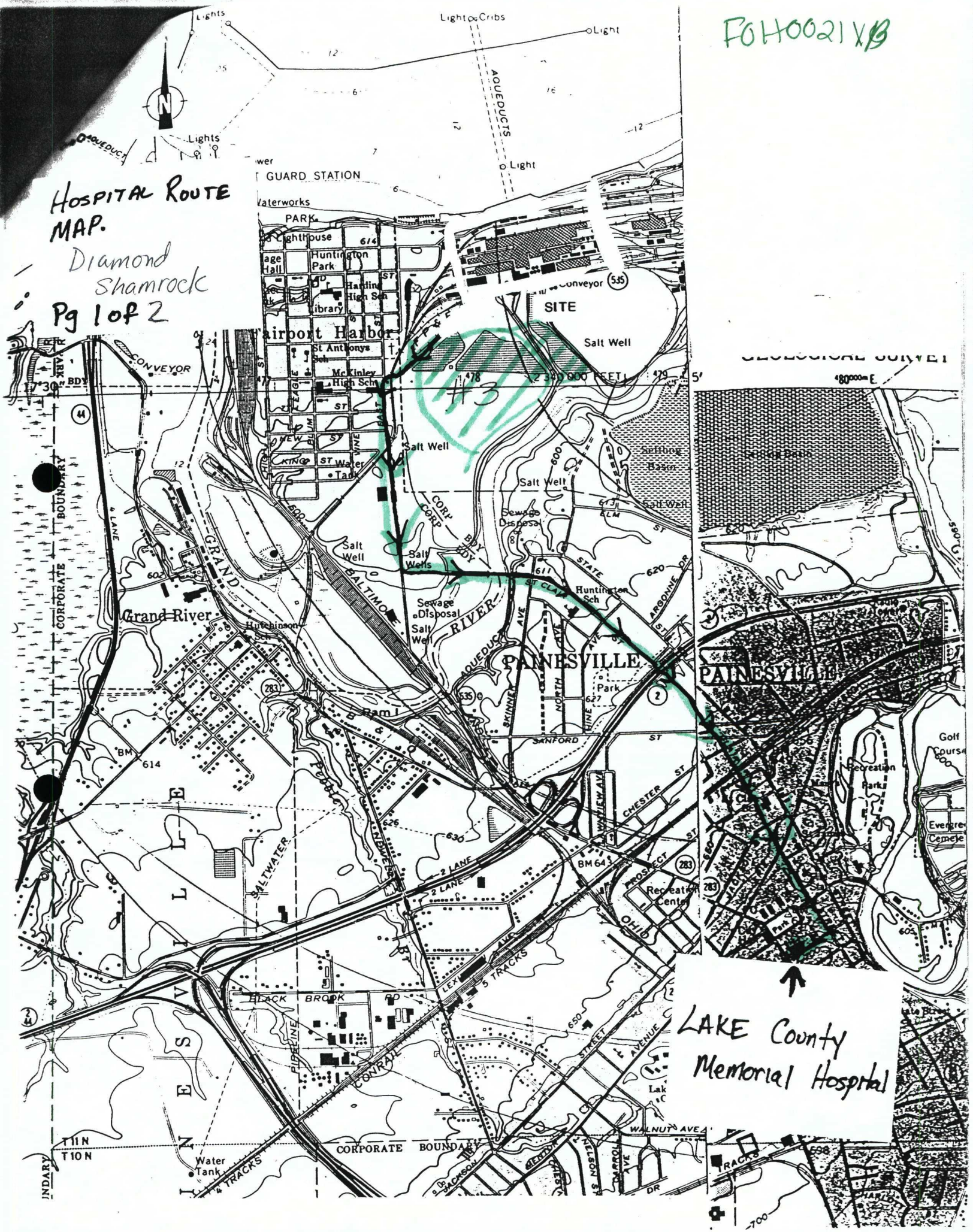
Lake County Memorial
36000 Euclid Avenue
Willoughby, Ohio
(216) 354-2400

FOH0021XB

Hospital Route Map.

Diamond Shamrock

Pg 1 of 2



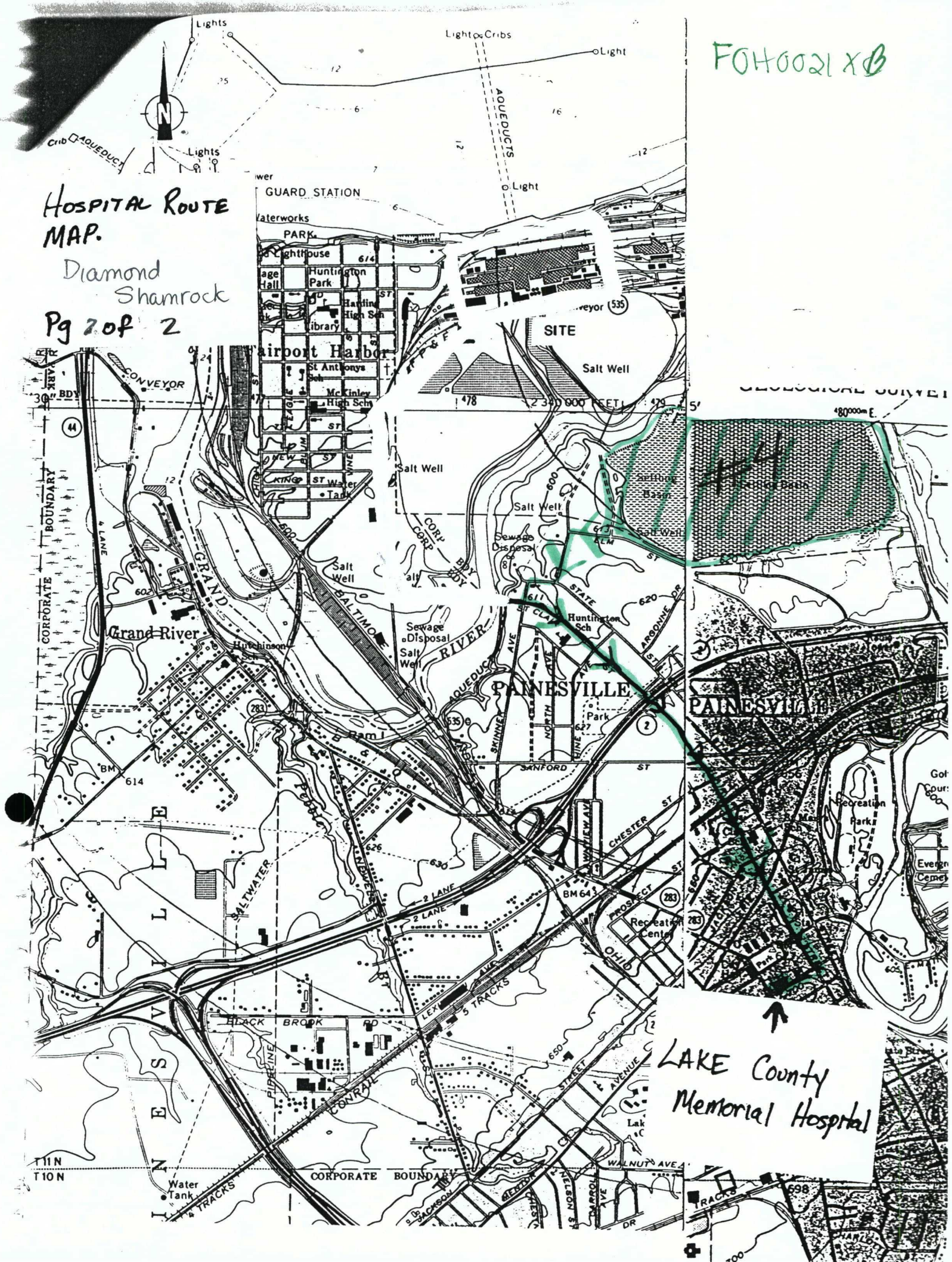
LAKE County Memorial Hospital

FOH0021 X B

HOSPITAL ROUTE MAP.

Diamond Shamrock

Pg 2 of 2



FOHQ0021XB

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

DATE : / /
JOB NO: _____

CHEMICAL NAME: Anthracene

SYN : Coal Tar Pitch Volatiles, Anthracin, Paranaphthalene, Green Oil
CAS NO: 120-12-7 FORMULA: C14H10
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: 644.00°F	Ionz Pot : 7.23ev	Fl Pt: 250.00°F
Mol Wt : 178.23	Melt Pt: 420.00°F	Vap Press: --	LFL : 0.60%
Sp Gr : 1.24	Frz Pt : --	Odr Thr : --	UFL : --

Odor : aromatic odor
INCOMPAT/REACT: strong oxidants, combustibles
SOLUBILITY : water-insoluble, solvents-soluble

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.01 ppm~~ 0.2 mg/m³ PEL (OSHA): ~~0.01 ppm~~ 0.2 mg/m³
STEL: -- IDLH: - 700 mg/m

OTHER PROPERTIES : NO EXPOSURE LIMITS ESTABLISHED-those shown are for COAL TAR PITCH VOLATILES
Tox Data: INHAL :
DERMAL : skn mus: 188 ug/MLD
ORAL : rats-tumorigenic
CARCIN : YES-as class of PAH's
MUTAGEN :
REPRO TOX:
AQUATIC : 5ppm/24hr/trout & bluegill/no effect
OTHER TOX: IRRITANT
ROUTES OF EXP: Ingestion, Dermal Absorption, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known hi concen or >1 but <5ppm; SCBA >5ppm
CARTRIDGE TYPE : GMC-H or AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: Viton, Neoprene
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, give O2/CPR as nec, SEEK MEDICAL ATTENTION
SKIN : flush w/water at least 15 min, wash skin with soap, SEEK MEDICAL ATTENTION
INGESTION : SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : shortness of breath, red painful skin/eyes, irr of eyes/skin/resp tract, sore throat, coughing, blurry vision, abdominal pain,
CHRONIC: dermatitis

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: A FIRE: 3,7 LEAKS & SPILLS: 4,6,7,8,9
DECOMPOSITION PRODUCTS: CO, CO2

REFERENCES CONSULTED

Merck Index, Chris(vol. III)
OTHER REFERENCES: Handling Chemical Safely, NFPA Guide, Sigma/Aldrich

CHEMICAL CLASSIFICATION: Coal Tar Derivative

LAST REVISION DATE:
~~10/19/89~~
03/27/91

F0400211B

ANTIHELMYCIN

CAS RN: 31282049 NIOSH #: WK 2130000
mf: $C_{20}H_{37}N_3O_{13}$; mw: 527.60

SYNS:
HYGROMIX-8 HYGROMYCIN B

TOXICITY DATA: 3 CODEN:
ipr-rat LD50:63 mg/kg GISAAA 38,11,73
ipr-gpg LD50:13 mg/kg GISAAA 38,11,73

THR: HIGH ipr.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

ANTIMONIC ACID, SODIUM SALT

CAS RN: 11112100 NIOSH #: CC 3065000

SYNS:
SODIUM ANTIMONATE SODIUM POLYANTIMONATE
SODIUM ANTIMONY

TOXICITY DATA: CODEN:
cyt-hmn:fbr 1 nmol/L AEMBAP 91,117,78
cyt-hmn:leu 1 nmol/L AEMBAP 91,117,78

THR: MUT data. See also antimony compounds.
Disaster Hazard: When heated to decomp it emits tox fumes of Sb and Na_2O.

ANTIMONIC ACID, TUNGSTEN SALT

NIOSH #: CC 3068000

mf: O_4SbW; mw: 369.60

SYNS:
TUNGSTEN ANTIMONATE TUNGSTEN STIBONATE

TOXICITY DATA: CODEN:
otr-ham:emb 80 umol/L CNREA8 39,193,79

THR: MUT data. See also tungsten and antimony compounds.
Disaster Hazard: When heated to decomp it emits tox fumes of Sb.

ANTIMONY

CAS RN: 7440360 NIOSH #: CC 4025000
mf: Sb; mw: 121.75

Silvery or gray lustrous metal. mp: 630°, bp: 1635°; d: 6.684 @ 25°, vap. press: 1 mm @ 886°. Insol in water, sol in hot conc H_2SO_4.

SYNS:
ANTIMONY BLACK C.I. 77050
ANTIMONY REGULUS STIBIUM
ANTYMON (POLISH)

TOXICITY DATA: 3 CODEN:
unk-man LDLo:15 mg/kg 85DCAI 2,73,70
ipr-rat LDLo:100 mg/kg INMEAF 10(2),15,41
ipr-gpg LDLo:150 mg/kg INMEAF 10(2),15,41

TLV: Air: 0.5 mg/m3 DTLVS* 4,20,80. *Toxicology Review:* FOREAE 7,313,42; PTPAD4 1,157,76. OSHA Standard: Air: TWA 500 ug/m3 (SCP-A) FEREAC 39,23540,74. Occupational Exposure to Antimony recm std: Air: TWA 0.5 mg/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 1 107, 173, 189, 193,197, VOL 2 S2, VOL 4 261*. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.
THR: HIGH unk (man), ipr. See also antimony compounds.
Fire Hazard: Mod in the forms of dust and vapor, when exposed to heat or flame. See also powdered metals. For further information see Vol. 2, No. 1 of *DPIM Report.*
Explosion Hazard: Mod, in the form of dust when exposed to flame.
Disaster Hazard: Mod dangerous; when heated or on contact with acid, emits tox fumes of SbH_3 •, electrolysis of acidifides, stirred Sb halide yields explosive Sb.
Incomp: It can react mod to violently with NH_4NO_3, halogens, BrN_3, BrF_3, $HClO_3$, ClO, ClF_3, HNO_3, KNO_3, $KMnO_4$, K_2O_2, $NaNO_3$, oxidants.

ANTIMONY AMMONIA TRIACETIC ACID

CAS RN: 72017608 NIOSH #: AF 5810000
mf: $C_{12}H_{14}N_2O_{12}Sb \cdot 2H_2O$; mw: 536.07

SYN: ATA-sb

TOXICITY DATA: 3 CODEN:
ivn-hmn TDLo:9 mg/kg/15D-I:SYS XPHPAW 411,158,74
ipr-mus LD50:62 mg/kg XPHPAW 441,131,74

Occupational Exposure to Antimony recm std: Air: TWA 0.5 mg/m3 NTIS**.
THR: A hmn SYS. HIGH ipr. See also antimony compounds.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x, Sb and NH_3.

ANTIMONY, BIS(TRICHLORO-, COMPOUNDED WITH 1 MOL. OF OCTAMETHYL PYROPHOSPHORAMIDE

CAS RN: 64046931 NIOSH #: CC 4200000
mf: $Cl_3Sb \cdot 1/2(C_8H_{24}N_4O_3P_2)$; mw: 371.25

TOXICITY DATA: 3 CODEN:
ipr-mus LD50:35 mg/kg JAFCAU 14,512,66

Occupational Exposure to Antimony recm std: Air: TWA 0.5 mg/m3 NTIS**.
THR: HIGH ipr. See also antimony compounds and phosphates.
Disaster Hazard: When heated to decomp it emits very tox fumes of Cl^-, Sb, PO_x and NO_x.

ANTIMONY (III) CHLORIDE

CAS RN: 10025919 NIOSH #: CC 4900000
mf: Cl_3Sb; mw: 228.10

Colorless rhombic deliq crystals. d: 3.06; mp: 73.4°; bp: 220°; vap. press: 1 mm @ 49.2° (subl). Sol in water [redacted] 20°, sol in alc, benzene and chloroform.

FOH00021 X0

ANTIMONY TRIOXIDE

ATX

Common Synonyms	Solid	White	Odorless
Diantimony trioxide Senarmontite Valentinite Exitelite Weisspiessglanz Flowers of antimony	Sinks in water		

AVOID CONTACT WITH SOLID AND DUST. KEEP PEOPLE AWAY.
Wear dust respirator and rubber overclothing (including gloves).
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.

Exposure

CALL FOR MEDICAL AID.

DUST
POISONOUS IF INHALED OR IF SKIN IS EXPOSED.
If inhaled will cause coughing, difficult breathing or loss of consciousness.
If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED.
If swallowed will cause dizziness, nausea, vomiting or loss of consciousness.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-poison
Restrict access
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: Sb_2O_3
3.3 IMO/UN Designation: 6.1/1549
3.4 DOT ID No.: 1549
3.5 CAS Registry No.: 1309-64-4

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Solid
4.2 Color: White
4.3 Odor: None

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Rubber gloves; safety goggles; dust mask
5.2 Symptoms Following Exposure: Inhalation causes inflammation of upper and lower respiratory tract, including pneumonitis. Ingestion causes irritation of the mouth, nose, stomach and intestines; vomiting, purging with bloody stools; slow pulse and low blood pressure; slow, shallow breathing; coma and convulsions sometimes followed by death. Contact with eyes causes conjunctivitis. Contact with skin causes dermatitis and rhinitis.
5.3 Treatment of Exposure: If any of the symptoms of poisoning, even slight, are noticed, the affected individual should be removed from contact with the chemical and placed under care of a physician. INGESTION: induce vomiting. EYES: flush with water for at least 15 min. SKIN: wash well with soap and water.
5.4 Threshold Limit Value: 0.5 mg/m³ (as antimony)
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 0; oral rat LD_{50} = 20,000 mg/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Data not available
5.9 Liquid or Solid Irritant Characteristics: Data not available
5.10 Odor Threshold: Odorless
5.11 IDLH Value: 80 mg/m³ as Sb

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Data not available
6.6 Behavior in Fire: Data not available
6.7 Ignition Temperature: Not pertinent
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not pertinent
6.10 Adiabatic Flame Temperature: Not pertinent
6.11 Stoichiometric Air to Fuel Ratio: Not pertinent
6.12 Flame Temperature: Not pertinent

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: Data not available
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity:
>80 ppm*/96 hr/fathead minnow/TL_m/ hard or soft fresh water
*as antimony
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: High

9. SHIPPING INFORMATION

9.1 Grades of Purity: Reagent, 99.9+%; Optical grade
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

II

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-E
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Solid
12.2 Molecular Weight: 291.50
12.3 Boiling Point at 1 atm: Not pertinent
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 5.2 at 25°C (solid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 46.3 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

CHRIS VOL III

A 107

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH0021 X B

DATE : / /
JOB NO: _____

CHEMICAL NAME: Arsenic

SYN : Metallic arsenic, Arsenic 75, Organic Arsenic
CAS NO: 7440-38-2 FORMULA: As
DOT CLASS: 1558/POISON

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: 1139.0 °F	Ionz Pot : ---	Fl Pt: --
Mol Wt : 74.9	Melt Pt: 1500.8 °F	Vap Press: 1.0 mmHg	LFL : --
Sp Gr : 5.72	Frz Pt : ---	Odr Thr : ---	UFL : --

Odor : none
INCOMPAT/REACT: heat, acids, oxidizing agents, halogens, air sensitive
SOLUBILITY : water-insoluble; nitric acid

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.06 ppm~~ 0.2 mg/m³ PEL (OSHA): ~~0.15 ppm~~ 0.01 mg/m³
STEL: --- IDLH: -- 100 mg/m³

OTHER PROPERTIES :
Tox Data: INHAL :
DERMAL :
ORAL : man TDLo: 7857 mg/kg/55Y
CARCIN : human positive
MUTAGEN : exper
REPRO TOX: exper
AQUATIC :
OTHER TOX: TARGET ORGANS: liver,kidneys,skin,lung,lymphat sys
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AP3 (NIOSH)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl, Neoprene
SPEC PRECAUTIONS : OSHA Regulated Carcinogen

FIRST AID

INHALATION: move to fresh air, give O2/CPR if nec. SEEK MEDICAL ATTENTION
EYE/SKIN : Remove cont. clothes, flush w/water 15 min. SEEK MEDICAL ATTENTION
IN IN : Rinse mouth w/water, treat for shock, SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : dermatitis,nose/throat irritation,mild bronchitis,headache,dizzy,fatigue,pale/blue face,diff breath,abd pain,diarrhea,trembling of arms/legs, convulsions, pulmonary edema
CHRONIC: loss of apetite,cramps,nausea,constipation,diarrhea,liver damage,blood,kidney & nervous syst. disturb, poss. skin cancer, lymphatic system affected.

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 11,13 LEAKS & SPILLS: 4,6,7,9
DECOMPOSITION PRODUCTS: arsenic oxides

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Handbook of Poisoning, Emerg Resp Guide, OSHA

CHEMICAL CLASSIFICATION: Non-metal/Metalloid

LAST REVISION DATE:
~~04/19/89~~
03/07/91

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH0021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Asbestos
SYN : Tremolite, Amosite, Chrysotile, Fibrous Grunerite, Anthophyllite, Actinolite
CAS NO: 1332-21-4 FORMULA: Varies
DOT CLASS: 2212 OR 2209

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: --	Ionz Pot : --	Fl Pt: --
Mol Wt : --	Melt Pt: --	Vap Press: --	LFL : --
Sp Gr : 2.5	Frz Pt : --	Odr Thr : --	UFL : --

Odor : none
INCOMPAT/REACT: NA
SOLUBILITY : NA

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): -- PEL (OSHA): --
STEL: -- IDLH: --
OTHER PROPERTIES : TLV: 0.2 to 2 fibers/cc PEL: .2 fibers/cc
Tox Data: INHAL : hum TCLo: 1.2fb/cc/19Y-C
DERMAL : -
ORAL : -
CARCIN : human & animal positive
MUTAGEN : -
REPRO TOX: -
AQUATIC : -
OTHER TOX: STEL: .1 fibers/cc; TARGET ORGANS: Lungs, Resp Sys, GI Tract
ROUTES OF EXP: Ingestion, Inhalation

OSHA 1910.1001

TABLE 1—RESPIRATORY PROTECTION FOR ASBESTOS, TREMOLITE, ANTHOPHYLLITE, AND ACTINOLITE FIBERS

Airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals	Required respirator
Not in excess of 2 f/cc (10 X PEL).	1. Half-mask air-purifying respirator, other than a disposable respirator, equipped with high-efficiency filters.
Not in excess of 10 f/cc (50 X PEL).	1. Full facepiece air-purifying respirator equipped with high-efficiency filters.
Not in excess of 20 f/cc (100 X PEL).	1. Any powered air-purifying respirator equipped with high-efficiency filters. 2. Any supplied-air respirator operated in continuous flow mode.
Not in excess of 200 f/cc (1000 X PEL).	1. Full facepiece supplied-air respirator operated in pressure-demand mode.
Greater than 200 f/cc (> 1,000 X PEL) or unknown concentration.	1. Full facepiece supplied air respirator operated in pressure-demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

NOTE: a. Respirators assigned for higher environmental concentrations may be used at lower concentrations.
b. A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers or larger.

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : <10f/cc-APR, <20f/cc-PAPR, see OSHA 1910.1001
CARTRIDGE TYPE : HEPA, GMC-H or other approved.
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Latex
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, blow nose to remove dust, do NOT sniffle, SEEK MEDICAL ATTENTION.
EYE/SKIN : remove contaminated clothes, flush w/water for 15min, SEEK MEDICAL ATTENTION.
INGESTION : SEEK MEDICAL ATTENTION.

SYMPTOMS

ACUTE : sneezing, slight irritation of nose, irritation and watering of eyes, inflammed conjunctivas

CHRONIC: lung cancer-mesothelioma, gastrointestinal cancer, cancer of larynx, asbestosis. Carcinogenic properties greatly potentiated by cigarette smoke.

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: 0 FIRE: 1,2,3,4 LEAKS & SPILLS: 1
DECOMPOSITION PRODUCTS:

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, RTECS
OTHER REFERENCES: OSHA 1710.1001

CHEMICAL CLASSIFICATION: Fibrous Silicate

LAST REVISION DATE:
04/19/89

P0H0021XB

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

DATE : / /
JOB NO: _____

CHEMICAL NAME: Barium

SYN : also as Soluble Barium Compounds
CAS NO: 7440-39-3 FORMULA: Ba
DOT CLASS:

CHEMICAL PROPERTIES (varies with specific substance)

Phys St: Solid	Boil Pt: —	Ionz Pot : 6.00ev	Fl Pt: —
Mol Wt : 137.30	Melt Pt: —	Vap Press: —	LFL : —
Sp Gr : 3.60	Frz Pt : —	Odr Thr : —	UFL : —

Odor :
INCOMPAT/REACT: powder form w/air results in spontaneous ignition, oxidants, water, acids, chlorinated solvents
SOLUBILITY :

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.00 ppm~~ 0.5 mg/m³ PEL (OSHA): ~~0.00 ppm~~ none
STEL: — IDLH: ~~250.00 ppm~~ 1100 mg/m³

OTHER PROPERTIES : TOXIC, IRRITANT
Tox Data: INHAL :
DERMAL :
ORAL :
CARCIN :
MUTAGEN :
REPRO TOX:
AQUATIC :
OTHER TOX: TARGET ORGANS: Heart, CNS, Skin, Resp Sys, Eyes
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known hi concen or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H, AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, give O2/CPR if nec, SEEK MEDICAL ATTENTION
EYES/SKIN : IMMEDIATELY flush w/water while removing contmd clothes, SEEK MEDICAL ATTENTION
INGESTION : induce vomiting, SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : vomtg/diarrhea, irr eyes/nose/resp tract/skin, slow pulse, abodom pain, trembling, faintness, irregular heartbeat, ringing in ears
CHRONIC: nervous system effects, heart disorders, kidney injury, gastro-intest tract, muscular system, paralysis of arms/legs, lungs, severe irritation or burns

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 2.10,12 LEAKS & SPILLS: 3,4,6,9,11
DECOMPOSITION PRODUCTS: Toxic fumes

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, Sax
OTHER REFERENCES: Handling Chemicals Safely, 1st Aid for Chem Accid, Sigma-Aldrich, NIOSH Guide

CHEMICAL CLASSIFICATION: Metal

LAST REVISION DATE:
~~10/19/89~~
03/27/91

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

POH0021XB

TE : / /
3 NO: _____

CHEMICAL NAME: Benzola3pyrene

SYN : 3,4 benzopyrene, Coal tar pitch volatiles
CAS NO: 50-32-8 FORMULA: C20H12
DOT CLASS:

CHEMICAL PROPERTIES

ys St: Solid | Boil Pt: 590.00°F | Ionz Pot : -- | Fl Pt: --
l Wt : 252.00 | Melt Pt: 354.00°F | Vap Press: 1.00 mmHg | LFL : --
Gr : 1.00 | Frz Pt : 354.00°F | Odr Thr : --- | UFL : --
or : faint aromatic
COMPAT/REACT: strong oxidizers
LUBILITY : yellow crystals, insol. in water, sol. in benzene, toluene, xylene

TOXICOLOGICAL PROPERTIES

posure Limits: TLV-TWA (ACGIH): 0.01 ppm PEL (OSHA): 0.01 ppm EXPOSURE LIMITS SHOWN ARE FOR COAL TAR PITCH VOLATILES
STEL: -- IDLH: --

HER PROPERTIES :
ox Data: INHAL : man TCLo: 70ug/m3
DERMAL : mouse TDLo: 240mg/kg
ORAL :
CARCIN : human & animal positive
MUTAGEN : human & animal positive
REPRO TOX: experimental teratogen
AQUATIC : -
OTHER TOX: DERMAL: skn mouse 14ug/MILD irritation
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

ESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
ARTRIDGE TYPE : GMC-H or AP3 (NACAL)
ROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: Viton
PEC PRECAUTIONS :

FIRST AID

NHV N: move to fresh air, give O2/CPR as nec, SEEK MEDICAL ATTENTION.
YE : Flush w/water at least 15min, Wash skin with soap/water, SEEK MEDICAL ATTENTION.
NGESTION : SEEK MEDICAL ATTENTION.

SYMPTOMS

CUTE : mucous membrane irritation & photosensitization and pulmonary edema.

HRONIC: cancer of lung,skin,squamous cell,tracheal,stomach; leukemia, conjunctivitis.

DISPOSAL, FIRE, SPILLS (see attached sheet)

ISPOSAL: A FIRE: 3,7 LEAKS & SPILLS: 6,7,8,10
ECOMPOSITION PRODUCTS: CO, CO2

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, Aldrich, RTECS
OTHER REFERENCES: Handbook of Poisoning, Sigma Aldrich, OSHA, Cond Chem Dict

CHEMICAL CLASSIFICATION: Polynuclear Aromatic Hydrocarbon, Coal Tar Pitch Volatile

LAST REVISION DATE:
05/03/89

FOH00021XB

BERYLLIUM

BEM

Common Synonyms	Solid	Silver color	Odorless
	Sinks in water.		

AVOID CONTACT WITH SOLID AND DUST. KEEP PEOPLE AWAY.
Wear dust respirator and rubber overclothing (including gloves).
Stop discharge if possible.
Call fire department.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
POISONOUS GASES MAY BE PRODUCED IN FIRE.
Dust cloud may explode if ignited in an enclosed area.
Wear goggles and self-contained breathing apparatus.
Extinguish with dry graphite, soda ash, or other inert powder.
DO NOT USE WATER ON FIRE.

Exposure

CALL FOR MEDICAL AID.

DUST
POISONOUS IF INHALED OR IF SKIN IS EXPOSED.
If inhaled will cause coughing or difficult breathing.
If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-poison, water contaminant
Restrict access
Should be removed
Chemical and physical treatment

2. LABEL

2.1 **Category:** None
2.2 **Class:** Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Not listed
3.2 **Formula:** Be
3.3 **IMO/UN Designation:** 6.1/1567
3.4 **DOT ID No.:** 1567
3.5 **CAS Registry No.:** 7440-41-7

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Solid
4.2 **Color:** White
4.3 **Odor:** None

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Bu. Mines approved respirator; clean work clothes daily; gloves; eye protection
5.2 **Symptoms Following Exposure:** Any dramatic, unexplained weight loss should be considered as possible first indication of beryllium disease. Dust is extremely toxic when inhaled; symptoms include coughing, shortness of breath, and acute or chronic lung disease. There is no record of illness from ingestion of beryllium. Contact with dust causes conjunctival inflammation of eyes and dermatitis.
5.3 **Treatment of Exposure:** INHALATION: acute disease may require hospitalization with administration of oxygen; chest x-ray should be taken immediately. EYES: flush with water for at least 15 min. SKIN: flush with water; wash with soap and water; all cuts, scratches or other injuries should receive prompt medical attention.
5.4 **Threshold Limit Value:** 0.002 mg/m³
5.5 **Short Term Inhalation Limits:** 0.025 mg/m³, less than 30 min.
5.6 **Toxicity by Ingestion:** Grade 3; oral LD_{50} = 100 mg/kg (mouse)
5.7 **Late Toxicity:** Berylliosis of lungs may occur from 3 months to 15 years after exposure. Chronic systemic diseases of the liver, spleen, lymph nodes, bone, kidney, and other organs may also occur.
5.8 **Vapor (Gas) Irritant Characteristics:** Data not available
5.9 **Liquid or Solid Irritant Characteristics:** Data not available
5.10 **Odor Threshold:** Odorless
5.11 **IDLH Value:** Data not available

6. FIRE HAZARDS

6.1 **Flash Point:** Not pertinent
6.2 **Flammable Limits in Air:** Not pertinent
6.3 **Fire Extinguishing Agents:** Graphite, sand, or any other inert dry powder
6.4 **Fire Extinguishing Agents Not to be Used:** Water
6.5 **Special Hazards of Combustion Products:** Combustion yields beryllium oxide fume, which is toxic if inhaled.
6.6 **Behavior in Fire:** Powder may form explosive mixture with air.
6.7 **Ignition Temperature:** Not pertinent
6.8 **Electrical Hazard:** Not pertinent
6.9 **Burning Rate:** Not pertinent
6.10 **Adiabatic Flame Temperature:** Data not available
6.11 **Stoichiometric Air to Fuel Ratio:** Data not available
6.12 **Flame Temperature:** Data not available

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** Data not available
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** Data not available

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** Data not available
8.2 **Waterfowl Toxicity:** Data not available
8.3 **Biological Oxygen Demand (BOD):** Data not available
8.4 **Food Chain Concentration Potential:** Data not available

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** Grade AA, 99.96+%; Grade A, 99.87+%; Nuclear grade
9.2 **Storage Temperature:** Ambient
9.3 **Inert Atmosphere:** No requirement
9.4 **Venting:** Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

II

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** Not listed
11.2 **NAS Hazard Rating for Bulk Water Transportation:** Not listed
11.3 **NFPA Hazard Classification:**

Category	Classification*
Health Hazard (Blue)	4
Flammability (Red)	1
Reactivity (Yellow)	0

*Applies to dust or powder.

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Solid
12.2 **Molecular Weight:** 9.01
12.3 **Boiling Point at 1 atm:** Not pertinent
12.4 **Freezing Point:** Not pertinent
12.5 **Critical Temperature:** Not pertinent
12.6 **Critical Pressure:** Not pertinent
12.7 **Specific Gravity:** 1.85 at 20°C (solid)
12.8 **Liquid Surface Tension:** Not pertinent
12.9 **Liquid Water Interfacial Tension:** Not pertinent
12.10 **Vapor (Gas) Specific Gravity:** Not pertinent
12.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
12.12 **Latent Heat of Vaporization:** Not pertinent
12.13 **Heat of Combustion:** −28,000 Btu/lb = −15,560 cal/g = −652 X 10^6 J/kg
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** Not pertinent
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** 260.0 cal/g
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** Data not available

NOTES

CHRIS Vol III

JUNE 1975

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH0021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Cadmium (dust)

SYN : C.I. 77180
CAS NO: 7440-43-9 FORMULA: Cd
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: 1412.00°F	Ionz Pot : --	Fl Pt: --
Mol Wt : 112.40	Melt Pt: --	Vap Press: --	LFL : --
Sp Gr : 8.64	Frz Pt : 609.00°F	Odr Thr : --	UFL : --

Odor :
INCOMPAT/REACT: sulfur,selenium,tellurium,zinc,hydrazoic acid,ammonium nitrate, potassium,oxidizing agents & acid
SOLUBILITY : insoluble in H2O; soluble in acids, non-reactive with alkalies

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.01 ppm~~ 0.05 mg/m³ PEL (OSHA): ~~0.04 ppm~~ 0.2 mg/m³
STEL: -- IDLH: -- 50 mg/m³

OTHER PROPERTIES : CEILING: 0.6 mg/mg3
Tox Data: INHAL : human LClo 39mg/m3/20M
DERMAL :
ORAL : rat LD50: 225mg/kg
CARCIN : animal pos.,human suspect
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC :
OTHER TOX: TARGET ORGANS: Resp Sys, Kidney, Prostate, Blood
ROUTES OF EXP: Ingestion, Dermal Absorption, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : AFR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AF3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move from area, O2/artf resp if nec, SEEK MEDICAL ATTENTION.
SKIN : Flush w/water at least 15min, SEEK MEDICAL ATTENTION.
INGESTION : Give milk, SEEK MEDICAL ATTENTION.

SYMPTOMS

ACUTE : nau/vomt,diarrhea,headache,musc. aches,salivation,abdom. pain,cough(foam/blood sputum),weakness,leg pain

CHRONIC: no sense of smell,cough,dyspnea,weight loss,anemia,irritability,yellow-stained teeth, liver/kidney damage

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 13 LEAKS & SPILLS: 7,10
DECOMPOSITION PRODUCTS: toxic fumes

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Handbook of Poisoning, OSHA

CHEMICAL CLASSIFICATION: Heavy Metal

LAST REVISION DATE:
~~04/19/89~~
03/27/91

FOH0021XB

Chemical Fact Sheet*

Version 2

CHROMIUM (III) OXIDE

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Chrome oxide, chromium oxide, chromium (3+) trioxide, chromium sesquioxide; CAS 1308-38-9.

Trade Names: Anadomis green, Casalis green, Chrome green, Chrome ochre, Chromia, Chromium oxide X1134, C.I. No. 77278, Leaf green, Levanox green GA, Ultramarine green and others.

Uses: In metallurgy, green paint pigment, ceramics, catalyst in organic syntheses, green granules in asphalt roofing, component of refractory brick, and cosmetics.

PHYSICAL INFORMATION

Appearance: Light to dark green, fine crystals.

Odor: None.

Behavior in Water: Insoluble, will sink.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 1 mg/m^3.

NIOSH Recommended Limit: None established.

ACGIH Recommended Limit: Average 8 hour exposure -- 0.5 mg/m^3.

Short Term Exposure:

Inhalation: No effects from inhalation of chromium (III) oxide alone have been reported. However, exposure to chromium (VI) compounds (such as sodium dichromate) can cause chromium sensitivity resulting in irritation of the nose and throat from subsequent exposure to any chromium compound.

Skin: See inhalation. Previous exposure to chromium (VI) compounds can lead to irritation.

Eyes: Can cause irritation.

Ingestion: No symptoms reported.

Long Term Exposure:

No effects reported. Chromium III compounds are not considered carcinogenic in animals or humans. Some chromium VI compounds are considered to be carcinogenic and may be generated in plating or welding processes. See specific compounds.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

FOH0021XB

Chromium (III) Oxide

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move person to fresh air. Give oxygen or artificial respiration as necessary.

Skin: Wash with soap and water for 5 minutes.

Eyes: Wash with water for 15 minutes. Seek medical attention, if necessary.

Ingestion: Seek medical attention, if necessary.

FIRE AND EXPLOSION INFORMATION

General: Non-flammable.

REACTIVITY

Conditions to Avoid: None.

Materials to Avoid: Reacts vigorously with glycerol, oxygen difluoride and lithium.

PROTECTIVE MEASURES

Storage and Handling: Store in a closed container away from materials listed above.

Engineering Controls: Use in a well-ventilated area. Sinks, showers, and eyewash stations should be available.

Protective Clothing (Should not be substituted for proper handling and engineering controls): If direct contact is likely, wear eye-goggles and gloves.

Protective Equipment: For levels up to 0.25 mg/m^3 use a dust and mist respirator (except single-use or quarter-mask types), a supplied-air respirator, or a self-contained breathing apparatus. For levels up to 0.625 mg/m^3 use a powered air-purifying respirator with a high efficiency particulate filter or a supplied-air respirator operated in continuous-flow mode. For levels up to 1.25 mg/m^3 use a respirator with a full facepiece and high-efficiency particulate filters, a powered air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter, a self-contained breathing apparatus with a full facepiece or a supplied-air respirator with a full facepiece. For levels up to 25 mg/m^3 use a self-contained breathing apparatus or a supplied-air respirator, both with a full facepiece and operated in a positive pressure mode. For levels up to 50 mg/m^3 use a supplied-air respirator with a full facepiece and operated in a positive pressure mode.. For levels above 50 mg/m^3 or in areas of unknown concentrations use a self-contained breathing apparatus with full facepiece operated in a positive pressure mode or a combination Type C supplied-air respirator with an auxiliary self-contained breathing apparatus, both with a full facepiece and operated in a positive pressure mode. For escape use a respirator with high-efficiency particulate filters or an escape self-contained breathing apparatus.

PROCEDURES FOR SPILLS AND LEAKS

Warn workers of spill. Wearing proper protective clothing sweep into a suitable container. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, 2 University Place, Albany, New York 12203.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V – Chicago

FOH0021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Chromium metal

SYN : Insoluble salts
CAS NO: 7440-47-3 FORMULA: Cr
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: 4784.00°F	Ionz Pot : —	Fl Pt: 0.23°F
Mol Wt : 52.00	Melt Pt: 3462.00°F	Vap Press: —	LFL : —
Sp Gr : 7.20	Frz Pt : 3339.00°F	Odr Thr : —	UFL : —

Odor : none
INCOMPAT/REACT: strong oxidizers, powdered metal is explosive
SOLUBILITY : insoluble

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.23 ppm~~ 0.5 mg/m³ PEL (OSHA): ~~0.47 ppm~~ 1 mg/m³
STEL: — IDLH: 235.57 ppm

OTHER PROPERTIES :
Tox Data: INHAL : -
DERMAL : -
ORAL : -
CARCIN : -
MUTAGEN : -
REPRO TOX: -
AQUATIC : -
OTHER TOX: TARGET ORGANS: Respiratory System
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H, AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : Flush w/water 15 min, wash skin w/soap & water, SEEK MEDICAL ATTENTION.
INGESTION : Give lg amts of water, induce vomiting, SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : conctact dermatitis, ulceration of skin/nasal mucosa, irritation of eyes/mucous membranes

CHRONIC: pulmonary disease

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 13 LEAKS & SPILLS: 3,4,6-9
DECOMPOSITION PRODUCTS:

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet
OTHER REFERENCES: NIOSH Guides, Sigma-Aldrich, OSHA

CHEMICAL CLASSIFICATION: Heavy metal

LAST REVISION DATE:
~~10/19/89~~

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH00021X3

DATE : / /
JOB NO: _____

CHEMICAL NAME: Cobalt

SYN : Cobalt
CAS NO: 7440-48-4 FORMULA: Co
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Solid | Boil Pt: 5612.00°F | Ionz Pot : — | Fl Pt: —
Mol Wt : 58.93 | Melt Pt: 2715.00°F | Vap Press: — | LFL : —
Sp Gr : 8.80 | Frz Pt : — | Odr Thr : — | UFL : —
Odor : none

INCOMPAT/REACT: strong oxidizers, corrodes in air, powder form is combustible
SOLUBILITY : water-insoluble, soluble in nitric acid

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.02 ppm~~ 0.05 mg/m3 PEL (OSHA): ~~0.02 ppm~~ 0.05 mg/m3
STEL: — IDLH: ~~0.31 ppm~~ 20 mg/m3

OTHER PROPERTIES : tumorigenic in animals
Tox Data: INHAL :
DERMAL :
ORAL :
CARCIN : YES
MUTAGEN :
REPRO TOX:
AQUATIC :
OTHER TOX: TARGET ORGANS: Respiratory System, Skin
ROUTES OF EXP: Ingestion, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known hi concent or >1 but <5ppm; SCBA >5ppm
CARTRIDGE TYPE : GMC-H, AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl
SPEC PRECAUTIONS : Dust is flammable; radioactive hazard

FIRST AID

INHALATION: move to fresh air, CPR if nec, SEEK MEDICAL ATTENTION
[illegible]N : Flush w/ water, wash skin w/soap, SEEK MEDICAL ATTENTION
[illegible]ION : SEEK MEDICAL ATTENTION IMMEDIATELY

SYMPTOMS

ACUTE : eye/nose/throat irrit, skin rash, dermatitis, shortness of breath, pain, vomtg, nerve deafness, convulsions, enlarged thyroid
CHRONIC: Respiratory disease, hypersensitivity, nodular fibrosis, polyeythemia

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 13 LEAKS & SPILLS: 7,9
DECOMPOSITION PRODUCTS: toxic fumes

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, Aldrich
OTHER REFERENCES: OSHA PEL's, Poison Handbook, Hawley's 10th

CHEMICAL CLASSIFICATION: Element

LAST REVISION DATE:
~~10/19/89~~
03/27/91

FOH0021XB

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move person to fresh air. Give oxygen or artificial respiration as necessary. Seek medical attention, if necessary.

Skin: Remove chemically soiled clothing. Wash with large amounts of water for at least 5 minutes. Seek medical attention if symptoms persist.

Eyes: Wash with large amounts of water for at least 15 minutes. See an opthalmologist (eye doctor) if symptoms persist.

Ingestion: Seek medical attention.

Note to Physician: Penicillamine or triethylene tetramine dihydrochloride may be beneficial in reducing body burden.

FIRE AND EXPLOSION INFORMATION

General: Fine copper powder is a moderate fire hazard.

Extinguisher: Powdered dolomite, sodium chloride (common salt) or graphite. Do Not use water.

REACTIVITY

Materials to Avoid: Reacts violently with acetylene, ammonium nitrate, bromates, chlorates, iodates, chlorine trifluoride, ethylene oxide, fluorine, hydrogen peroxide, hydrazine mononitrate, hydrogen sulfide, hydrazoic acid, lead azide, potassium peroxide, sodium azide and sodium peroxide.

Conditions to Avoid: High temperatures of smelting, welding, or fire may cause production of copper fumes.

PROTECTIVE MEASURES

Storage and Handling: Avoid conditions which create fumes or fine dusts.

Engineering Controls: Ventilate as needed. Sinks, showers, and eyewash stations should be readily available.

Protective Clothing (Should not be substituted for proper handling and engineering controls): Dust and splash proof safety goggles.

Protective Equipment: If fumes are present: For levels up to 1 mg/m^3 use a respirator with dust, mist and fume filters, a supplied-air respirator or a self-contained breathing apparatus. For levels up to 2.5 mg/m^3 use a powered air-purifying respirator with dust, mist and fume filters or a supplied-air respirator operated in continuous-flow mode. For levels up to 5 mg/m^3 use a respirator with high-efficiency particulate filters, a powered air-purifying respirator with tight-fitting facepiece and high efficiency particualte filters, a self-contained breathing apparatus with a full facepiece or a supplied-air respirator with a full facepiece or operated in continuous-flow mode. For levels up to 100 mg/m^3 use a supplied-air respirator operated in a positive pressure mode. For levels up to 200 mg/m^3 use a supplied-air respirator with full facepiece operated in a positive pressure mode.

If fumes are NOT present: For levels up to 5 mg/m^3 use a respirator with dust and mist filters (except a single-use respirator). For levels up to 10 mg/m^3 use a respirator with dust and mist filters (except for single-use and quarter-mask respirators), a supplied-air respirator or a self-contained breathing apparatus. For levels up to 25 mg/m^3 use a powered air-purifying respirator with dust and mist filters or a supplied-air respirator operated in continuous-flow mode. For levels up to 50 mg/m^3 use a high efficiency particulate respirator with a full facepiece, a supplied-air respirator with a full facepiece, a self-contained breathing apparatus with a full facepiece or a powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filters. For levels up to 1000 mg/m^3 use a supplied-air respirator operated in a positive pressure mode. For levels up to 2000 mg/m^3 use a supplied-air respirator with full facepiece operated in a positive pressure mode.

For entry into areas of unknown concentrations use a self-contained breathing apparatus with a full facepiece operated in a positive pressure mode or a combination Type C supplied-air respirator with an auxiliary self-contained breathing apparatus, both with a full facepiece and operated in a positive pressure mode. For escape use a respirator with high-efficiency particulate filters or an escape self-contained breathing apparatus.

PROCEDURES FOR SPILLS AND LEAKS

Warn other workers of spill. Put on proper protective equipment and clothing. Sweep or vacuum up solids being careful not to raise dust levels. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, 2 University Place, Albany, New York 12203.

FOH0021XB

Chemical Fact Sheet*

Version

COPPER

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Metallic copper, copper (0); CAS 7440-50-8.

Trade Names: Allbri Natural Copper, CDA, C.I. Pigment Metal 2, Raney Copper, Arwood Copper, and others.

Uses: In the manufacture of copper alloys such as brass and bronze; as an electrical conductor; in the production of copper salts; and many others.

PHYSICAL INFORMATION

Appearance: Reddish, lustrous metal that becomes dull on exposure to air.

Odor: None.

Behavior in Water: Insoluble, sinks.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 1 mg/m^3 (dusts and mists).
Average 8 hour exposure -- 0.1 mg/m^3 (fumes).

NIOSH Recommended Limit: None established.

ACGIH Recommended Limit: Average 8 hour exposure -- 1 mg/m^3 (dust and mists).
Average 8 hour exposure -- 0.2 mg/m^3 (fumes).

Short Term Exposure:

Inhalation: Copper or copper oxide fumes may cause metal fume fever whic includes chills, fever, aching muscles, dry mouth and throat, headache, nausea, vomiting, diarrhea and stomach pain. Onset may be delayed severa hours.

Skin: May cause irritation. Solution can cause swelling and itching.

Eyes: May cause irritation. See long term exposure.

Ingestion: May cause stomach pain, nausea, vomiting and diarrhea. These symptoms reported from ingestion of 10 mg of copper by an adult and 8.5 m by a child.

Long Term Exposure:

No long term effects from inhalation or ingestion reported. Copper fragments in the corena may cause cataracts, discoloration (Kaper - Fleischer rings), and loss of the eye. Note: Individuals with Wilson's Disease may wish to limit occupational exposure to copper.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health. For an explanation of the terms and abbreviations used see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH0021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: DDT

SYN : Dichlorodiphenyltrichloroethane
CAS NO: 50-29-3 FORMULA: (ClC6H4)2CHCCl3
DOT CLASS: 2761

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: --	Ionz Pot : --	Fl Pt: 162.00°F
Mol Wt : 354.50	Melt Pt: 228.00°F	Vap Press: --	LFL : --
Sp Gr : 1.56	Frz Pt : 226.00°F	Odr Thr : 0.35ppm	UFL : --

Odor : none
INCOMPAT/REACT: strong oxidizers, iron, alum salts, alkaline materials, pyridine
SOLUBILITY : insoluble-H2O, sol in acetone, ether, benzene, carbon tetrachloride, kerosene, dioxane

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.05 ppm~~ 1 mg/m3 SKIN PEL (OSHA): ~~0.05 ppm~~ 1 mg/m3 SKIN
STEL: -- IDLH: --

OTHER PROPERTIES :
Tox Data: INHAL : -
DERMAL : rat LD50: 1931 mg/kg
ORAL : rat LD50: 113 mg/kg
CARCIN : human suspect,animal pos
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC : 0.0039ppm/24hr/bass/TL50/fresh water
OTHER TOX: TARGET ORGANS: CNS, Kidney, Liver, Skin, PNS
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : AFR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMP or AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Nitrile
SPEC PRECAUTIONS : High concentrations in air are dangerous to exposed skin, eyes, and mucous membranes

FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION.
EYE/SKIN : Remove contmd. clothes, Flush w/water 15min, wash skin w/soap & water, SEEK MEDICAL ATTENTION
INGESTION : SEEK MEDICAL ATTENTION.

SYMPTOMS

ACUTE : severe vomiting, weakness/numbness of extremities, apprehension, excitement, diarrhea, twitching of eyelids, muscular tremors, tonic & clonic convulsions, death 2-24 hours.
CHRONIC: liver and/or kidney damage, CNS defects, paralysis of hands, agranulocytosis, dermatitis

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: D FIRE: 6,7 LEAKS & SPILLS: 3,4,5,6,9
DECOMPOSITION PRODUCTS:

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Handbook of Poisoning, OSHA, Cond Chem Dict.

CHEMICAL CLASSIFICATION: Organochloride Insecticide; Polychlorinated Nondegradable Pesticide

LAST REVISION DATE: 05/10/89

FLUORACIZINE

CAS RN: 30223484 NIOSH #: SO 4700000
mf: $C_{20}H_{21}F_3N_2OS$; mw: 394.49

SYN: 10-DIETHYLAMINOPROPIONYL-3-TRIFLUOROMETHYL PHENOTHIAZINE HYDROCHLORIDE

TOXICITY DATA: 3	CODEN:
unk-rat TDLo:300 mg/kg/(16-21D preg):TER	RPTOAN 36(4),178,73
unk-mus TDLo:10 mg/kg (4D preg)	RPTOAN 36 ,178,73
unk-rbt TDLo:140 mg/kg (16-29D preg)	RPTOAN 36 ,178,73

THR: An exper TER.
Disaster Hazard: When heated to decomp it emits very tox fumes of SO_x, NO_x and F^-.

FLUORANTHENE

CAS RN: 206440 NIOSH #: LL 4025000
mf: $C_{16}H_{10}$; mw: 202.26

A polycyclic hydrocarbon. Colorless solid. mp: 120°, bp: 367°, vap. press: 0.01 mm @ 20°.

SYNS:

BENZO(JK)FLUORENE	1,2-(1,8-NAPHTHYLENE)BENZENE
IDRYL	

TOXICITY DATA: 3	CODEN:
mma-sat 100 mg/L/72H	FCTXAV 17,141,79
skn-mus TDLo:280 mg/kg/58W-I TFX:ETA	JNCIAM 56,1237,76
orl-rat LD50:2000 mg/kg	AIHAAP 23,95,62
ivn-mus LD50:100 mg/kg	CSLNX* NX#00205
skn-rbt LD50:3180 mg/kg	AIHAAP 23,95,62

"NIOSH Manual of Analytical Methods" VOL 1 183, 184. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.
THR: An exper ETA. HIGH ivn. MOD oral and skin. MUT data.
Fire Hazard: Slight, when exposed to heat or flame.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

1,1'-(3,9-FLUORANTHENEDIYL)BIS(2-(DIMETHYLAMINO)ETHANONE) DIHYDROCHLORIDE HYDRATE

CAS RN: 64296500 NIOSH #: KM 5776000
mf: $C_{24}H_{24}N_2O_2 \cdot 2ClH \cdot xH_2O$; mw: 571.56

SYN: RMI 11645 DA

TOXICITY DATA: 2	CODEN:
orl-mus LD50:2590 mg/kg	ALACBI 12,77,79
scu-mus LD50:930 mg/kg	ALACBI 12,77,79

THR: MOD orl, scu.
Disaster Hazard: When heated to decomp it emits very tox fumes of HCl and NO_x.

FLUORAPATITE

CAS RN: 1306054 NIOSH #: LL 4850000
mf: $Ca_{10}F_2O_4P$; mw: 533.77

SYN: PHOSPHATE ROCK

TOXICITY DATA:
Occupational Exposure to Inorganic Fluorides-recm std: Air: TWA 2.5 mg(F)/m3 NTIS**.
THR: See also fluorides and phosphates.
Disaster Hazard: When heated to decomp it emits very tox fumes of F^- and PO_x.

FLUOREN-2-AMINE

CAS RN: 153786 NIOSH #: LL 5075000
mf: $C_{13}H_{11}N$; mw: 181.25

SYNS:

AMINOFLUOREN (GERMAN)	2-FLUORENAMINE
2-AMINOFLUORENE	2-FLUORENEAMINE

TOXICITY DATA: 3	CODEN:
dnd-rat:lvr 4200 nmol/L	CNREA8 40,3579,80
dns-rat:lvr 500 nmol/L	ENMUDM 3,11,81
bfa-rat/sat 10 mg/kg	ENMUDM 1,155,79
msc-rat:lvr 100 umol/L	ENMUDM 2,278,80
dnr-sat 50 ug/plate	MUREAV 89,1,81
mma-omi 20 ug/plate	CBINA8 22,297,78
orl-rat TDLo:3600 mg/kg/32W-C:CAR	CNREA8 15,188,55
skn-rat TDLo:240 mg/kg/73W-I:CAR	JNCIAM 10,1201,50
scu-rat TDLo:400 mg/kg/26W-I:ETA	CNREA8 7,453,47
orl-mus TDLo:100 mg/kg/47W-C:ETA	CNREA8 7,453,47
skn-mus TDLo:11 mg/kg/34W-C:NEO	BJCAAI 14,195,60
imp-mus TDLo:50 mg/kg:CAR	BJCAAI 12,222,58
orl-rat TD:4000 mg/kg/23W-C:ETA	CNREA8 7,730,47
orl-rat TD:3200 mg/kg/58W-C:ETA	CNREA8 7,453,47
orl-rat TD:2420 mg/kg/23W-C:NEO	JNCIAM 10,1201,50
imp-mus TD:100 mg/kg:ETA	BMBUAQ 14,147,58

Toxicology Review: 85CVA2 5,63,70.
THR: An exper CARC, ETA, NEO. MUT data.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

FLUORENE-9,9-(BIS)PROPYLAMINE

CAS RN: 2409190 NIOSH #: LL 5860000
mf: $C_{19}H_{24}N_2$; mw: 280.45

SYN: 9,9'-FLUORENEDIPROPYLAMINE

TOXICITY DATA: 2	CODEN:
eye-rbt 500 mg SEV	IHFCAY 6,1,67
orl-rat LD50:620 mg/kg	IHFCAY 6,1,67

THR: MOD oral. A severe irr to rbts' eyes.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

9-FLUORENECARBOXYLATE-3-QUINUCLIDINOL, HYDROCHLORIDE

CAS RN: 548652 NIOSH #: VD 7180000
mf: $C_{21}H_{22}NO_2 \cdot ClH$; mw: 356.90

SYN: FLUORENE-9-CARBOXYLIC ACID, 3-QUINUCLIDINYL ESTER

FOH0021XB

HYDROCHLORIC ACID

HCL

Common Synonyms	Watery liquid	Colorless	Sharp, irritating odor
Muriatic Acid	Sinks and mixes with water. Irritating vapor is produced.		

AVOID CONTACT WITH LIQUID AND VAPOR. Keep people away.
Wear chemical protective suit with self-contained breathing apparatus.
Stop discharge if possible.
Stay upwind and use water spray to "knock down" vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
Flammable gas may be produced on contact with metals.
Wear chemical protective suit with self-contained breathing apparatus.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause coughing or difficult breathing.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-corrosive
Restrict access
Disperse and flush

2. LABEL

2.1 Category: Corrosive
2.2 Class: 8

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Non-oxidizing mineral acid
3.2 Formula: $HCl\text{-}H_2O$
3.3 IMO/UN Designation: 8.0/1789
3.4 DOT ID No.: 1789
3.5 CAS Registry No.: 7647-01-0

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless to light yellow
4.3 Odor: Pungent; sharp, pungent, irritating

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Self-contained breathing equipment, air-line mask, or industrial canister-type gas mask; rubber or rubber-coated gloves, apron, coat, overalls, shoes.
5.2 Symptoms Following Exposure: Inhalation of fumes results in coughing and choking sensation, and irritation of nose and lungs. Liquid causes burns.
5.3 Treatment of Exposure: INHALATION: remove person to fresh air; keep him warm and quiet and get medical attention immediately; start artificial respiration if breathing stops. INGESTION: have person drink water or milk; do NOT induce vomiting. EYES: immediately flush with plenty of water for at least 15 min. and get medical attention; continue flushing for another 15 min. if physician does not arrive promptly. SKIN: immediately flush skin while removing contaminated clothing; get medical attention promptly; use soap and wash area for at least 15 min.
5.4 Threshold Limit Value: 5 ppm
5.5 Short Term Inhalation Limits: 5 ppm for 5 min.
5.6 Toxicity by Ingestion: Data not available
5.7 Late Toxicity: None
5.8 Vapor (Gas) Irritant Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
5.9 Liquid or Solid Irritant Characteristics: Fairly severe skin irritant; may cause pain and second-degree burns after a few minutes' contact.
5.10 Odor Threshold: 1-5 ppm
5.11 IDLH Value: 100 ppm

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic and irritating vapors are generated when heated.
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: Not flammable
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not flammable
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: Corrosive to most metals with evolution of hydrogen gas, which may form explosive mixtures with air.
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Flush with water; apply powdered limestone, slaked lime, soda ash, or sodium bicarbonate.
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 1

8. WATER POLLUTION

8.1 Aquatic Toxicity: 282 ppm/96 hr/mosquito fish/TL_m/fresh water
100-330 ppm/48 hr/shrimp/LC_{50}/salt water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Food processing or technical: 18° Be-27.9%, 20 Be-31.5%, 22° Be-35.2%; Reagent, ACS, and USP: 23° Be-37.1%
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-P

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Corrosive material
11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	0
Health	
Vapor Irritant	3
Liquid or Solid Irritant	3
Poisons	2
Water Pollution	
Human Toxicity	2
Aquatic Toxicity	2
Aesthetic Effect	2
Reactivity	
Other Chemicals	3
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	3
Flammability (Red)	0
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 36.46
12.3 Boiling Point at 1 atm: 123°F = 50.5°C = 323.8°K
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.19 at 20°C (liquid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: 178 Btu/lb = 98.6 cal/g = 4.13 X 10^5 J/kg
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: —860 Btu/lb = —480 cal/g = —20 X 10^5 J/kg
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 13.0 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 8.0 psia

*Physical properties apply to 37 % solution.

NOTES

CHRIS VOC III

H7

JUNE 1985

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

FOH00021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Lead

SYN : White lead, Plumbum, Inorganic Lead
CAS NO: 7439-92-1 FORMULA: Pb
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Solid	Boil Pt: 3164.00°F	Ionz Pot :	Fl Pt: --
Mol Wt : 207.00	Melt Pt: 620.00°F	Vap Press:	LFL : --
Sp Gr : 11.30	Frz Pt : --	Odr Thr :	UFL : --

Odor : none
INCOMPAT/REACT: strong oxidizers, peroxides, active metals
SOLUBILITY :

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.01 ppm~~ 0.15 mg/m³ PEL (OSHA): -- 0.050 mg/m³
STEL: -- IDLH: -- 700 mg/m³

OTHER PROPERTIES : PEL - 50ug/m3
Tox Data: INHAL : -
DERMAL : -
ORAL : rat TDLo: 790mg/kg
CARCIN : indefinite
MUTAGEN : -
REPRO TOX: exper teratogen
AQUATIC : -
OTHER TOX: TARGT ORGNS: GI Trct,CNS,Kid,Bld,Gingival Tissue
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H, AF3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Saranex Gloves: Nitrile
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15 minutes, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : give water, induce vomiting, SEEK MEDICAL ATTENTION IMMEDIATELY

SYMPTOMS

ACUTE : cumulative neurotoxin (prolong expos), stomach distress, vomtg, diarrhea, black stools, anemia, nervous system effects
CHRONIC: alimentary: abdm pain/discomf,constptn,diarrh neuromusc: musc weaknss,joint/musc pain,dizzy,insom, encephalic: brain involvment, stupor, coma,death-rare reprod: poison to m/f germ cells

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 13 LEAKS & SPILLS: 7,8,10
DECOMPOSITION PRODUCTS: toxic fumes of lead

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, OSHA 1910., Handbook of Poisoning

CHEMICAL CLASSIFICATION: Heavy Metal

LAST REVISION DATE:
~~04/18/89~~
03/27/91

FOH002WB

ecology and environment. inc.

Job No HAZARD EVALUATION OF CHEMICALS 12/14/90

Chemical Name: MANGANESE Preparation Date 4-13-89

CAS Number: DOT Name/UN No.

References Consulted:

NIOSH/OSHA Pocket Guide VERSCHUERAN MERCK INDEX HAZARDLINE ACGIH TOXIC & HAZARDOUS SAFETY MANUAL
CHRIS SAX Other IGS DATABASE

Chemical Properties:

Synonyms: CIKKIUDAK NABGANESE, CUTEVAL,

Chemical Formula MN Molecular weight 55

Physical State SOLID Solubility (H20) DECOMPOSES Boiling Point 3564 F

Flash Point FLAMMABLE Vapor Press/Density 1 MM Freezing Point 1 MM SP G 7.20

Odor Characteristic Flammable Limits

Incompatabilities STRONG OXIDIZERS, STRONG ACIDS

Biological Properties:

IDLH 10,000 PPM TLV-TWA ~~23,00 UG/M3~~ 5 mg/m3 PEL 5 MG/M3 Odor Threshold

Human Aquatic Rat/Mouse

Route of Exposure INHALATION EYES, SKIN

Carcinogen Tetatogen Mutagen

Handling Recommendations (Personal Protective Measures):

AVOID SKIN, EYE CONTACT WEAR IMPERVIOUS CLOTHING

Monitoring Recommendations:

Disposal/Waste Treatment:

Health Hazards and First Aid:

IN THE EYES, RINSE WITH LARGE AMOUNTS OF WATER SKIN RINSE & WASH WITH SOAP, GET MEDICAL ATTENTION PROMPTLY

Symptoms: Acute: NAUSEA, VOMITING, METAL FUME FEVER, BRONCHITIS, CRAMPS, COUGHING, HEAD ACHE, MANY OTHERS

Chronic: IN RATS CAUSED FETOTOXITY AND MUTAGENIC

...ty and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

F0H0021XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Mercury

SYN : Quicksilver, Inorganic Mercury
CAS NO: 7439-97-6 FORMULA: Hg
DOT CLASS: 2809

CHEMICAL PROPERTIES

Phys St: Liquid
Mol Wt : 200.59
Sp Gr : 13.55
Odor : none

Boil Pt: 675.00°F
Melt Pt: -38.00°F
Frz Pt : -38.00°F

Ionz Pot : --
Vap Press: 0.0012 mmHg
Odr Thr : --

Fl Pt: --
LFL : --
UFL : --

INCOMPAT/REACT: acetylene,ammnia gs,halgens,strg oxdizers,ht sulfuric acid,chlorine dioxide,azides,chlorates,nitrate
SOLUBILITY : insoluble

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.001 ppm~~ 0.1 mg/m³ SKIN
STEL: --
PEL (OSHA): ~~0.01 ppm~~ 0.05 mg/m³ SKIN
IDLH: ~~3.41 ppm~~ 28 mg/m³

OTHER PROPERTIES : PEL IS A CEILING; DO NOT EXCEED IN 15 MIN.
Tox Data: INHAL : wom TCLO: 150ug/m3/46D
DERMAL : -
ORAL : -
CARCIN : -
MUTAGEN : -
REPRO TOX: animal teratogen
AQUATIC : 0.29ppm/48hr/marine fish/TLm/salt water
OTHER TOX: TARGET ORGANS: Skin, Resp Sys, CNS, Kidney, Eye
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

ESPIRATORS : AFR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
ARTRIDGE TYPE : GMC-H
OTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: Neoprene
PEC PRECAUTIONS : High concentrations in air are dangerous to skin, eyes, mucous membranes. Other Exposure Limits are given for different Mercury types.

FIRST AID

HALATION: move to fresh air, artf resp is nec., SEEK MEDICAL ATTENTION
E/SKIN : remove contamtd. clothes, flush w/water 15 min, wash skin w/soap & water, SEEK MEDICAL ATTENTION
GEST... : SEEK MEDICAL ATTENTION

SYMPTOMS

UTE : headaches,cough,chest pain/tightness,diffic. breath,chemical pneumanitis, sore mouth,loss of teeth,naus,diarrhea,skin irritation
ONIC: shaking of hands, eyelids, lips, tongue or jaw; allergic skn rash, headache, sores in mouth, sore/swollen gums, loose teeth, insomnia, excess salivation, personality changes, irritatibility

DISPOSAL, FIRE, SPILLS (see attached sheet)

POSAL: P
FIRE: 11,13
LEAKS & SPILLS: 18
OMPOSITION PRODUCTS: toxic fumes

REFERENCES CONSULTED

H/OSHA Pocket Guide, Chris(vol. III), ACGIH TLV Booklet, RTECS
R REFERENCES: NIOSH Guide, Sigma-Aldrich

ICAL CLASSIFICATION: Metal

LAST REVISION DATE:
~~05/05/89~~
03/27/...

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

P0H0021XB

DATE : / /
JOB NO: _____

SYN : Synonyms vary depending on specific compound
CAS NO: 7440-02-0
DOT CLASS:

CHEMICAL NAME: Nickel
FORMULA: Ni

CHEMICAL PROPERTIES

Phys St: Solid
Mol Wt : 58.70
Sp Gr : 8.90
Odor : none

Boil Pt: 5188.00°F
Melt Pt: 2651.00°F
Frz Pt : 2651.00°F

Ionz Pot : --
Vap Press: --
Odr Thr : --

Fl Pt: --
LFL : --
UFL : --

INCOMPAT/REACT: heat,strong acids,oxidizers,sulfur,titanium,ammonium nitrate,potassium perchlorate,hydrazoic acid
SOLUBILITY : insoluble

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.41 ppm~~ 1 mg/m³
STEL: --
PEL (OSHA): ~~0.41 ppm~~ 1 mg/m³
IDLH: --

OTHER PROPERTIES : IRRITANT
Tox Data: INHAL : -
DERMAL : -
ORAL : rat Tdlo: 158mg/kg
CARCIN : Animal posit, human susp
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC : -
OTHER TOX: TARGET ORGANS: Nasal Cavities, Lungs, Skin
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Saranex Gloves: Nitrile
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, CPR if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15 min, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : DO NOT INDUCE VOMITING, SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : irritation of skin/eyes/mucous membranes of upper resp tract, naus/vomt, giddiness, headache

CHRONIC: dermatitis resulting from skin sensitization; cancer of lung & nasal passages in nickel refining employees

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P
FIRE: 2
LEAKS & SPILLS: 3,4,6-9
DECOMPOSITION PRODUCTS: nickel carbonyl, oxides of nitrogen

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, ACGIH TLV Booklet
OTHER REFERENCES: NIOSH Guides, Sigma-Aldrich

CHEMICAL CLASSIFICATION: Metal

LAST REVISION DATE:
~~05/10/89~~
03/27/91

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

PO H0021 NB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Polychlorinated Biphenyl 1242
SYN : PCB 1242, Arochlor 1242, Chlorodiphenyl
CAS NO: 53469-21-9 FORMULA: C12H7Cl3
DOT CLASS: 2315

CHEMICAL PROPERTIES

Phys St: Liquid | Boil Pt: 617.00°F | Ionz Pot : — | Fl Pt: 349.00°F
Mol Wt : 258.00 | Melt Pt: — | Vap Press: 0.001 mmHg | LFL : —
Sp Gr : 1.30 | Frz Pt : -2.00°F | Odr Thr : 0.0095 ppm | UFL : —
Odor : pleasant, butter like
INCOMPAT/REACT: strong oxidizers
SOLUBILITY : insoluble

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.09 ppm~~ 1 mg/m3 SKIN PEL (OSHA): ~~0.09 ppm~~ SKIN 1 mg/m3
STEL: — IDLH: ~~0.47 ppm~~ 10 mg/m3
OTHER PROPERTIES : affects male/female reproduction, Genetic injury to animals in experiments, PERSIS, TOXIC
Tox Data: INHAL : human Tclo: 10mg/m3
DERMAL : -
ORAL : rat LD50: 4250mg/kg
CARCIN : human suspect
MUTAGEN : animal positive
REPRO TOX: teratogen
AQUATIC : Tlm 96: .278 ppm
OTHER TOX: TARGET ORGANS: Skin, Liver, Resp Sys, Eyes
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : To be determined on a case-by-case basis by H & S Staff.
CARTRIDGE TYPE : GMC-H or AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Saranex Gloves: Neoprene, Viton Boots: Neoprene for soil sampling in known conc.
SPEC PRECAUTIONS : High concentrations in air are dangerous to exposed skin, eyes, mucous membranes.

FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15min, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : give salt water, induce vomiting, SEEK MEDICAL ATTENTION IMMEDIATELY

SYMPTOMS

ACUTE : irritation of skin/eyes/nose/throat, can cause vomiting, edema, anorexia, nausea, abdominal pain, fatigue, pigmentation of skin & nails
CHRONIC: chloracne,acute/chronic may cause liver damage/cancer,Heart/kidney edema; reprod: orl ing may be embryotoxic causg stillbirth,grey-brn skin,incr. eye dischrg to babies born to women exposd during preg

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: D,Ø
FIRE: 7
LEAKS & SPILLS:
DECOMPOSITION PRODUCTS: HCl, CO

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Poison Handbook

CHEMICAL CLASSIFICATION: Halogen Cmpd, Aromatic, Polycyclic

LAST REVISION DATE:
~~05/10/89~~
03/27/91

PYRENE

CAS RN: 129000 NIOSH #: UR 2450000
mf: $C_{16}H_{10}$; mw: 202.26

Colorless solid, solutions have a slight blue color, insol in water, fairly sol in organic solvents. (a condensed ring hydrocarbon), mp: 156°, d: 1.271 @ 23°, bp: 404°.

SYNS:
BENZO(DEF)PHENANTHRENE PYREN (GERMAN)

TOXICITY DATA: 3 CODEN:
dnd-esc 10 umol/L PNCCA2 -,39,65
dnd-sal:spr 3 gm/L BIPMAA 5,477,67
dnd-sal:tes 5 ug/1H-C BIJOAK 110,159,68
skn-rbt 500 mg/24H MOD 28ZPAK -,26,72
mma-sat 140 umol/L/2H CNREA8 39,4152,79
msc-rat:emb 10 mg/L JTEHD6 4,79,78
otr-ham:emb 10 mg/L CNREA8 31,1118,71
cyt-ham:emb 10 mg/L CNREA8 31,1118,71
dnd-mam:lym 100 umol BIPMAA 9,689,70
skn-mus TDLo:10 gm/kg/3W-I:ETA BJCAAI 10,363,56

NIOSH Manual of Analytical Methods" VOL 1 183,184. Reported in EPA TSCA Inventory, 1980.
THR: MUT data. A skn irr. An exper ETA.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

N-PYREN-2-YLACETAMIDE

CAS RN: 1732145 NIOSH #: AC 7840000
mf: $C_{18}H_{13}NO$; mw: 259.32

SYN: 2-ACETYLAMINOPYRENE

TOXICITY DATA: 3 CODEN:
orl-rat TDLo:5508 mg/kg/32W-C:NEO CNREA8 15,188,55

THR: An exper NEO.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

1-PYRENYLOXIRANE

NIOSH #: RR 0878000
mf: $C_{18}H_{12}O$; mw: 244.2

TOXICITY DATA: CODEN:
mmo-sat 100 pmol/plate CNREA8 40,642,80
msc-ham:lng 1 umol/L CNREA8 40,642,80

THR: MUT data.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

PYRETHRIN

CAS RN: 97110 NIOSH #: GZ 1575000
mf: $C_{21}H_{28}O_3$; mw: 328.49

SYNS:
2-CYCLOPENTENYL-4-HYDROXY-3-METHYL-2-CYCLOPENTEN-1-ONE CHRYSANTHEMATE
3-(2-CYCLOPENTEN-1-YL)-2-METHYL-4-OXO-2-CYCLOPENTEN-1-YL CHRYSANTHEMUMATE
3-(2-CYCLOPENTENYL)-2-METHYL-4-OXO-2-CYCLOPENTENYL CHRYSANTHEMUMMONOCARBOXYLATE
CYCLOPENTENYLRETHONYL CHRYSANTHEMATE
ENT 22,952

TOXICITY DATA: 2 CODEN:
orl-rat LD50:1410 mg/kg ARSIM* 20,7,66
unk-rat LD50:900 mg/kg 30ZDA9 -,131,71

Toxicology Review: 27ZTAP 3,43,69.
THR: MOD orl, unk. See also esters. An insecticide.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

PYRETHRIN I

CAS RN: 8003347 NIOSH #: UR 4200000
mf: $C_{21}H_{28}O_3$; mw: 328.4

Viscous liquid; bp: 170° @ 0.1 mm (decomp).

SYNS:
CINERIN I OR II
JASMOLIN I OR II
PYRETHRIN I OR II
CHRYSANTHEMUM CINERAREAEFOLIUM
DALMATION INSECT FLOWERS
INSECT POWDER
PYRETHRUM (INSECTICIDE)
TRIESTE FLOWERS

TOXICITY DATA: 3 CODEN:
orl-rat LD50:200 mg/kg GUCHAZ 6,442,73
orl-mus LD50:370 mg/kg EVHPAZ 14,15,76
orl-mam LD50:250 mg/kg AMIHAB 14,178,56

TLV: Air: 5 mg/m3 DTLVS* 4,352,80. OSHA Standard: Air: TWA 5 mg/m3 (SCP-U) FEREAC 39,23540,74.
THR: MOD orl, unk. See also esters. An allergen. Has produced diarrhea, convulsions, collapse and respiratory failure, nausea, tinnitus, headache and CNS upset. A highly insecticidal extract of weak mammalian tox. Rapid detoxified in GI tract. For the long term, slight but definite liver damage occurs at 1000 ppm and 5000 ppm diet levels. Usual early symptoms are a contact dermatitis, asthma, sneezing. A dose of 15g was fatal to a child.
Fire Hazard: Slight.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

PYRETHRIN II

CAS RN: 121299 NIOSH #: GZ 0700000
mf: $C_{22}H_{28}O_5$; mw: 372.50

Viscous liquid; bp: 200° @ 0.1 mm (decomp).

SYNS:
ENT 7,543
PYRETHROLONE CHRYSANTHEMUM DICARBOXLIC ACID METHYL ESTER ESTER
PYRETHROLONE ESTER OF CHRYSANTHEMUMDICARBOXYLIC ACID MONOMETHYL ESTER
PYRETRIN II

TOXICITY DATA: 2 CODEN:
unk-man LDLo:1029 mg/kg 85DCAI 2,73,70
orl-rat LD50:1200 mg/kg 12VXA5 8,889,68

Toxicology Review: 27ZTAP 3,121,69. Reported in EPA TSCA Inventory, 1980.
THR: MOD orl, unk. See also pyrethrin I; An insecticide.
Disaster Hazard: When heated to decomp it smoke and fumes.

FOH0021XB

SELENIUM TRIOXIDE

STO

Common Synonyms	Solid White
Selenic anhydride	AVOID CONTACT WITH SOLID AND DUST. KEEP PEOPLE AWAY.

Wear goggles, dust respirator, and rubber overclothing (including gloves).
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.

Exposure

CALL FOR MEDICAL AID.

DUST
POISONOUS IF INHALED OR IF SKIN IS EXPOSED.
If inhaled will cause coughing or difficult breathing.

If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
Irritating to skin and eyes.
If swallowed will cause coughing, nausea, and vomiting.

Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-corrosive, water contaminant
Restrict access
Disperse and flush

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: SeO_3
3.3 IMO/UN Designation: Not listed
3.4 DOT ID No.: Data not available
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Solid
4.2 Color: White
4.3 Odor: Data not available

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: This compound is highly toxic if ingested or inhaled. Dust mask; goggles or face shield; rubber gloves
5.2 Symptoms Following Exposure: Absorption of selenium may be demonstrated by presence of the element in the urine and by a garlic-like odor of breath. Inhalation can cause bronchial spasms, symptoms of asphyxiation, and pneumonitis. Acute symptoms of ingestion include sternal pain, cough, nausea, pallor, coated tongue, gastrointestinal disorders, nervousness and conjunctivitis. Contact with eyes or skin causes irritation.
5.3 Treatment of Exposure: INHALATION: remove victim to fresh air; give oxygen if necessary. INGESTION: induce vomiting; follow with gastric lavage and saline cathartics. EYES: flush immediately and thoroughly with water. SKIN: flush with water.
5.4 Threshold Limit Value: 0.2 mg/m³ (as selenium)
5.5 Short Term Inhalation Limits: 0.3 mg/m³, 30 min. (as selenium)
5.6 Toxicity by Ingestion: Data not available
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Data not available
5.9 Liquid or Solid Irritant Characteristics: Data not available
5.10 Odor Threshold: Data not available
5.11 IDLH Value: 100 mg/m³

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Data not available
6.6 Behavior in Fire: Data not available
6.7 Ignition Temperature: Not pertinent
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not pertinent
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: Reacts vigorously with water to form selenic acid solution
7.2 Reactivity with Common Materials: Corrodes all metals when moisture is present
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Flush with water, rinse with dilute solution of sodium bicarbonate or soda ash.
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity: Data not available
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Commercial; also shipped as a 40% solution in water (selenic acid)
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

RR

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Not listed
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Solid
12.2 Molecular Weight: 126.9
12.3 Boiling Point at 1 atm: Not pertinent (decomposes)
12.4 Freezing Point: 244°F = 118°C = 391°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 3.6 at 20°C (solid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

SODIUM-5-(BUTYLTHIOMETHYL)-5-PROPYLBARBITURATE

CAS RN: 67050775 NIOSH #: CQ 2412000
mf: $C_{12}H_{19}N_2O_3S \cdot Na$; mw: 294.38

SYN: 5-(BUTYLTHIOMETHYL)-5-PROPYLBARBITURIC ACID SODIUM SALT

TOXICITY DATA:	3	CODEN:
ipr-mus LD50:272 mg/kg		JAPMA8 35,231,46
ivn-rbt LD50:69 mg/kg		JAPMA8 35,244,46

THR: HIGH ipr, ivn.
Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x, SO_x and Na_2O.

SODIUM-5-(1-BUTYLTHIO)PROPYL)-5-ETHYL-2-THIOBARBITURATE

CAS RN: 67050800 NIOSH #: CQ 2418000
mf: $C_{13}H_{21}N_2O_2S_2 \cdot Na$; mw: 324.46

SYN: 5-(1-(BUTYLTHIO)PROPYL)-5-ETHYL-2-THIOBARBITURIC ACID SODIUM SALT

TOXICITY DATA:	3	CODEN:
ivn-rat LD50:70 mg/kg		JPETAB 88,343,46
ivn-rbt LD50:40 mg/kg		JAPMA8 35,244,46

THR: HIGH ivn.
Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x, SO_x and Na_2O.

SODIUM CARBONATE (2:1)

CAS RN: 497198 NIOSH #: VZ 4050000
mf: $CO_3 \cdot 2Na$; mw: 105.99

White, odorless, small crystals or crystalline powder. Alk taste; mp: 851°; bp: decomp; d: 2.509 @ 0°.

SYNS:
CARBONIC ACID, DISODIUM SALT
SODA ASH
CRYSTOL CARBONATE

TOXICITY DATA:	3-2	CODEN:
skn-rbt 500 mg/24H MOD		28ZPAK -,8,72
eye-rbt 100 mg/24H SEV		28ZPAK -,8,72
orl-rat LDLo:4000 mg/kg		CNJMAQ 12,216,48
ipr-mus LD50:117 mg/kg		COREAF 257,791,63

Reported in EPA TSCA Inventory, 1980.
THR: HIGH ipr; MOD orl. A skn, eye irr. A general-purpose food additive, it migrates to food from packaging materials. Can react violently with Al, P_2O_5, H_2SO_4, F_2, Li, 2,4,6-trinitro-toluene.

SODIUM CARBOXYMETHYL CELLULOSE

CAS RN: 9004324 NIOSH #: FJ 5950000

A synthetic cellulose gum (the sodium salt of carboxy methyl cellulose not <99.5% on a dry weight basis, with maximum substitution of 0.95 carboxymethyl groups per anhydroglucose unit, and with a minimum viscosity of 25 centipoises for 2% weight aqueous solutions at 25°). Colorless, odorless, hygroscopic powder or granules, insol in most organic solvents.

SYNS:
CARBOXYMETHYLCELLULOSE, SODIUM SALT
SODIUM SALT OF CARBOXYMETHYLCELLULOSE
CELLULOSE GLYCOLIC ACID, SODIUM SALT

TOXICITY DATA:	3	CODEN:
scu-rat TDLo:1900 mg/kg/19W-I:NEO		13BYAH -,83,62
scu-rat TD:8600 mg/kg/19W-I:NEO		13BYAH -,83,62
scu-rat TD:33 gm/kg/22W-I:NEO		PAACA3 18,225,77
orl-rat LD50:27000 mg/kg		FOREAE 13,29,48
orl-gpg LD50:16000 mg/kg		FOREAE 13,29,48

Reported in EPA TSCA Inventory, 1980.
THR: An exper NEO. LOW orl. See polymers, soluble. A general-purpose food additive, it is a substance which migrates to food from packaging materials.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes of Na_2O.

SODIUM CARRAGHEENATE

CAS RN: 9061829 NIOSH #: FI 0710000

A mixture of highly sulfated polygalactosides and is extracted from seaweeds (FAONAU 53A,598,74)

SYN: CARRAGEENAN, SODIUM SALT

TOXICITY DATA:	1	CODEN:
orl-rat LD50:5650 mg/kg		FAONAU 53A,398,74
orl-mus LD50:9200 mg/kg		FDRLI* 124,-,76
orl-rbt LD50:4670 mg/kg		FAONAU 53A,398,74
orl-ham LD50:7530 mg/kg		FAONAU 53A,398,74

Reported in EPA TSCA Inventory, 1980.
THR: LOW orl.
Disaster Hazard: When heated to decomp it emits tox fumes of SO_x and Na_2O.

SODIUM CARRIOMYCIN

NIOSH #: FI 0789200
mf: $C_{47}H_{80}O_{15} \cdot Na$; mw: 908.26

SYN: T-42082

TOXICITY DATA:	3-2	CODEN:
orl-mus LD50:2000 mg/kg		JANTAJ 31,7,78
ipr-mus LD50:125 mg/kg		JANTAJ 31,7,78

THR: HIGH ipr; MOD orl.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes of Na_2O.

SODIUM CASEINATE

CAS RN: 9004363 NIOSH #: FI 3540000

Coarse white powder, odorless; water sol.

SYNS:
CASEIN-SODIUM
NUTROSE

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V – Chicago

FOH0021 XB

DATE : / /
JOB NO: _____

CHEMICAL NAME: Sulfuric Acid

SYN : Battery Acid, Oil of Vitriol
CAS NO: 7664-93-9 FORMULA: H2SO4
DOT CLASS:

CHEMICAL PROPERTIES

Phys St: Liquid | Boil Pt: 518.00°F | Ionz Pot : — | Fl Pt: —
Mol Wt : 98.08 | Melt Pt: 37.00°F | Vap Press: 0.001 mmHg | LFL : —
Sp Gr : 1.84 | Frz Pt : 50.00°F | Odr Thr : 0.25ppm | UFL : —
Odor : odorless
INCOMPAT/REACT: organics, metals, water, chlorates, carbides, fulminates, picrates
SOLUBILITY : miscible but highly reactive

TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): ~~0.24 ppm~~ 1 mg/m3 PEL (OSHA): ~~0.24 ppm~~ 1 mg/m3
STEL: — 3 mg/m3 IDLH: ~~15.92 ppm~~ 80 mg/m3

OTHER PROPERTIES :
Tox Data: INHAL : guinea: LC50: 18mg/m3
DERMAL :
ORAL : rat: LD50: 2140 mg/kg
CARCIN :
MUTAGEN :
REPRO TOX:
AQUATIC : 24.5ppm/24hr/blugil/lethal/fresh water
OTHER TOX: TARGET ORGANS: Resp Sys, Eyes, Skin, Teeth
ROUTES OF EXP: Ingestion, Dermal Absorption, Skin Contact, Inhalation

PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMB or GME-H, GMC
PROTECTIVE CLOTHING: Coverall: Saranex Gloves: Neoprene
SPEC PRECAUTIONS :

FIRST AID

INHALATION: move to fresh air, give O2/CPR as nec. SEEK MEDICAL ATTENTION
EYE/SKIN : Flush w/water for 15min, treat skin burns by applying dry, sterile dressing. SEEK MEDICAL ATTENTION
INGESTION : Give milk or water in lg qty. DO NOT INDUCE VOMITING. SEEK MEDICAL ATTENTION

SYMPTOMS

ACUTE : severe burns to skin,eyes,respir. tract, cough, diffic. breathing, headache, bluish face/lips, salivation, abdom cramps, naus/vomit, tongue changes white to black and corrosion of teeth.
CHRONIC:

DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: N FIRE: 2,12 LEAKS & SPILLS: 1,4,6,9
DECOMPOSITION PRODUCTS:

REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: 1st Aid for Chem Accidents, Emerg. Resp. Guide, H/H Indus. Tox., Sigma-Aldrich

CHEMICAL CLASSIFICATION: Inorganic Acids

LAST REVISION DATE: ~~04/10/89~~

FOH0021XB

THALLIUM SULFATE

TSU

Common Synonyms	Solid	Colorless to white	Odorless
Sulfuric acid, thallium salt Ratox Zelio Thallous sulfate	Sinks and mixes with water.		

Avoid contact with solid. Keep people away.
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.

Exposure

CALL FOR MEDICAL AID.

SOLID.
Poisonous if swallowed or if skin is exposed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-poison; water contaminant. Should be removed.

2. LABEL

2.1 **Category:** Poison
2.2 **Class:** 6

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Not listed
3.2 **Formula:** Tl_2SO_4
3.3 **IMO/UN Designation:** 6.1/1707
3.4 **DOT ID No.:** 1707
3.5 **CAS Registry No.:** Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Solid
4.2 **Color:** Colorless to white.
4.3 **Odor:** None

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Data not available
5.2 **Symptoms Following Exposure:** SKIN: Loss of hair and skin eruptions (keratinization, petechiae, ecchymoses). INGESTION OR SKIN ABSORPTION: Pain and tingling or numbness of the extremities, drooping eyelids, incoordination of muscular action, loss of hair, fever, inflammed and runny nose, conjunctivitis, abdominal pain, nausea and vomiting. Lethargy, jumbled speech, tremors, convulsions and cyanosis may follow. Pulmonary edema and pneumonia may precede death from respiratory failure.
5.3 **Treatment of Exposure:** Call a doctor. INHALATION: Remove from exposure. EYES: Flush with running water. SKIN: Wash with soap and water. INGESTION: Induce vomiting and perform gastric lavage with a solution of 1% sodium or potassium iodide. Activated carbon may be effective if administered early. Castor oil (1 oz.) as a cathartic.
5.4 **Threshold Limit Value:** 0.1 mg/m³ skin.
5.5 **Short Term Inhalation Limits:** 0.3 mg/m³
5.6 **Toxicity by Ingestion:** Grade 4; LD_{50} <50 mg/kg.
5.7 **Late Toxicity:** Chronic exposure may cause hair loss, atrophic changes in skin and nails, salivation, pigmentation of the gums, and renal damage. Psychotic symptoms such as nervousness, anxiety, depression, impaired memory, sloppiness and deteriorating work performance indicate organic brain damage. Tetatogenic effects in laboratory animals.
5.8 **Vapor (Gas) Irritant Characteristics:** Not pertinent
5.9 **Liquid or Solid Irritant Characteristics:** Data not available
5.10 **Odor Threshold:** Not pertinent
5.11 **IDLH Value:** 20 mg/m³

6. FIRE HAZARDS

6.1 **Flash Point:** Not pertinent
6.2 **Flammable Limits in Air:** Not flammable
6.3 **Fire Extinguishing Agents:** Not pertinent
6.4 **Fire Extinguishing Agents Not to be Used:** Not pertinent
6.5 **Special Hazards of Combustion Products:** Not pertinent
6.6 **Behavior in Fire:** Not pertinent
6.7 **Ignition Temperature:** Not flammable
6.8 **Electrical Hazard:** Not pertinent
6.9 **Burning Rate:** Not pertinent
6.10 **Adiabatic Flame Temperature:** Data not available
6.11 **Stoichiometric Air to Fuel Ratio:** Data not available
6.12 **Flame Temperature:** Data not available

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** No reaction
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** Data not available

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** 0.03 ppm/Atlantic Salmon/LC_{50}
10 ppm/96-hour/Brown Shrimp/LC_{50}
8.2 **Waterfowl Toxicity:** Data not available
8.3 **Biological Oxygen Demand (BOD):** Data not available
8.4 **Food Chain Concentration Potential:** Probably high-is a cumulative poison.

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** Data not available
9.2 **Storage Temperature:** Data not available
9.3 **Inert Atmosphere:** Data not available
9.4 **Venting:** Data not available

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

SS

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** Poison, B
11.2 **NAS Hazard Rating for Bulk Water Transportation:** Not listed
11.3 **NFPA Hazard Classification:** Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Solid
12.2 **Molecular Weight:** 504.85.
12.3 **Boiling Point at 1 atm:** Data not available
12.4 **Freezing Point:** 1169.5°F = 632°C = 905.2°K
12.5 **Critical Temperature:** Not pertinent
12.6 **Critical Pressure:** Not pertinent
12.7 **Specific Gravity:** 6.77 at 20°C.
12.8 **Liquid Surface Tension:** Not pertinent
12.9 **Liquid Water Interfacial Tension:** Not pertinent
12.10 **Vapor (Gas) Specific Gravity:** Not pertinent
12.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
12.12 **Latent Heat of Vaporization:** Not pertinent
12.13 **Heat of Combustion:** Not pertinent
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** (Absorbs heat). 29.5 Btu/lb = 16.4 cal/g = 6.86 X 10^4 J/kg
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** 10.9 cal/g
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** Data not available

NOTES

JUNE 1985

TSI CHRIS III

i-VALERYL-k-STROPHANTHIDIN

CAS RN: 63979737 NIOSH #: FH 4980000
mf: $C_{28}H_{40}O_7$; mw: 488.68

SYN: ISOVALERYL-K-STROPHANTHIDIN

TOXICITY DATA:	3	CODEN:
ivn-cat LDLo:880 ug/kg		AEPPAE 185,329,37
ivn-rbt LDLo:700 ug/kg		AEPPAE 185,329,37

THR: HIGH ivn.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

VALINE

CAS RN: 72184 NIOSH #: YV 9361000
mf: $C_5H_{11}NO_2$; mw: 117.17

An essential amino acid; white crystalline solid; sol in water; very slightly sol in alc; insol in ether; mp (dl): 298° (decomp); mp (1): 315°; d (1): 1.230.

SYNS:
L(+)-ALPHA-AMINOISOVALERIC ACID L-VALINE

TOXICITY DATA:	1	CODEN:
ipr-rat LD50:5390 mg/kg		ABBIA4 58,253,55

Reported in EPA TSCA Inventory, 1980.
THR: LOW ipr. A nutrient and/or dietary supplemental food additive.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

d-VALINE

CAS RN: 640686 NIOSH #: YV 9360000
mf: $C_5H_{11}NO_2$; mw: 117.17

TOXICITY DATA:	1	CODEN:
ipr-rat LD50:6093 mg/kg		ABBIA4 64,319,56

Reported in EPA TSCA Inventory, 1980.
THR: LOW ipr.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

VALINOMYCIN

CAS RN: 2001958 NIOSH #: YV 9468000
mf: $C_{54}H_{90}N_6O_{18}$; mw: 1111.50

Shiny rectangular platelets. mp: 190°. Almost insol in water; very sol in petr ether, ether, benzene, chloroform, glacial acetic acid, butyl acetate, acetone.

SYN: ANTIBIOTIC N-329 B

TOXICITY DATA:	3	CODEN:
orl-mus LD50:2500 ug/kg		85ERAY 1,325,78
ipr-mus LD50:980 ug/kg		85ERAY 1,325,78
scu-mus LD50:4140 ug/kg		85ERAY 1,325,78

Reported in EPA TSCA Inventory, 1980.
THR: HIGH orl, ipr, scu.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

VALISONE

CAS RN: 2152445 NIOSH #: TU 3835000
mf: $C_{27}H_{37}FO_6$; mw: 476.64

SYNS:
BETAMETHASONE-17-VALERATE BETA-METHASONE-17-VALERATE

TOXICITY DATA:	3-2	CODEN:
scu-rat LDLo:2000 mg/kg		ARZNAD 27,2102,77
scu-mus LDLo:100 mg/kg		ARZNAD 27,2102,77

THR: HIGH scu; MOD scu.
Disaster Hazard: When heated to decomp it emits tox fumes of F^-.

VALONEA TANNIN

NIOSH #: YW 0305000

SYNS:
QUERCUS AEGILOPS L. TANNIN TANNIN FROM VALONEA

TOXICITY DATA:	3	CODEN:
scu-rat TDLo:750 mg/kg/2W-I TFX:ETA		BJCAAI 14,147,60

THR: An exper ETA. See also tannin.

VANADIUM

CAS RN: 7440622 NIOSH #: YW 1355000
af: V; aw: 50.94

A bright white, soft ductile metal; slightly radioactive; bp: 3000°; d: 6.11 @ 18.7°; mp: 1917°. Insol in water.

TOXICITY DATA:	3	CODEN:
ims-rat TDLo:340 mg/kg/43W-I TFX:ETA		NCIUS* PH 43-64-886,SEPT,71

TLV: Air: 0.05 mg/m3 DTLVS* 4,425,80. Occupational Exposure to Vanadium recm std: Air: TWA 1.0 mg(V)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 3 S391, VOL 5 173#,290#. Reported in EPA TSCA Inventory, 1980.
THR: An exper ETA. See also vanadium compounds.
Fire Hazard: MOD in dust form from heat or flame, sparks.
Disaster Hazard: Violent reaction with BrF_3, Cl_2, Li, oxidants.

VANADIUM AZIDE TETRACHLORIDE

mf: Cl_4N_3V; mw: 234.76

THR: No tox data. See also vanadium compounds, azides, chlorides. Explosive.
Disaster Hazard: When heated to decomp it emits very tox fumes of Cl^- and NO_x.

VANADIUM COMPOUNDS

THR: Variable. Vanadium compounds act chiefly as irr to the conjunctivae and respiratory tract. Prolonged exposures may lead to pulmonary involvement. There is still some controversy as to the effects of industrial exposure on other systems of the body. Responses are acute, never chronic.

FOH0021XB

ecology and environment, inc.

Job No HAZARD EVALUATION OF CHEMICALS 12/14/90

Chemical Name: ZINC Preparation Date 5-24-90

CAS Number: DOT Name/UN No.

References Consulted:

NIOSH/OSHA Pocket Guide VERSCHUERAN MERCK INDEX HAZARDLINE ACGIH TOXIC & HAZARDOUS SAFETY MANUAL

CHRIS SAX Other OHS

Chemical Properties:

Synonyms: BLUE POWDER, CI 77945 JASAD

Chemical Formula ZN Molecular weight 6537

Physical State SOLID Solubility (H20) INSOLUBLE Boiling Point 1655 F

Flash Point NON FLAM Vapor Press/Density 909 F Freezing Point 787 F SP G 714

Odor Characteristic Flammable Limits

Incompatabilities ACIDS, SODIUM PEROXIDE, CHLORINE, WATER SULFER

Biological Properties:

IDLH TLV-TWA PEL N/A Odor Threshold

Human Aquatic Rat/Mouse

Route of Exposure EYE, SKIN CONTACT, INHALATION, INGESTION

Carcinogen Tetatogen Mutagen

Handling Recommendations (Personal Protective Measures):

PREVENT PROLONGED SKIN CONTACT WEAR IMPERVIOUS CLOTHING, GLOVES AND FACESHIELD

Monitoring Recommendations:

Disposal/Waste Treatment:

PLACE CONTAMINATED CLOTHING IN CLOSED CONTAINERS FOR STORAGE UNTIL LAUNDERED OR DISCARD

Health Hazards and First Aid:

IF IT GETS IN EYES WASH WITH LARGE AMOUNTS OF WATER, GET MEDICAL ATTENTION IMMEDIATELY

Symptoms: Acute: SKIN IRRATATION, COUGHING WEAKNESS, MUSCULAR ACHE, FEVER, NAUSEA VOMITING

Chronic: NONE SPECIFIED

WASTE-DISPOSAL METHODS

The disposal methods outlined below are intended only as guides. We do not assume responsibility for their use. Careful consideration must be given to the chemical and physical properties of the substance. In addition, local laws and regulations may preclude the use of these methods which are primarily designed for small quantities. Observe all federal, state, and local laws.

The disposal of some chemicals may require deactivation or modification of the material by chemical means. Chemical waste-disposal reactions must be handled with the same care and consideration used with synthetic procedures. Appropriate consideration must be given to reaction conditions, *i.e.*, stoichiometry, order and rate of addition, heat of reaction, evolution of gaseous products, pH, efficiency of stirring, rate of reaction, atmospheric sensitivity, etc.

Chemical waste-disposal reactions should be carried out in a chemical fume hood and in appropriate laboratory glassware. Because these reactions are often vigorous, protective safety equipment such as safety goggles, respirator, gloves, face and/or safety shield and other protective equipment must be used.

Initial reactions in a disposal sequence should be carried out on a small scale (5-10g). The reactant concentrations should not exceed 10% of the reaction volume and the final reaction volume should not exceed 50% of the working capacity of the reaction vessel, regardless of the reaction scale. Larger quantities of the material should be handled in several small-size reactions. To ensure completion of reaction, the waste disposal procedure should be run for at least an additional 4 to 8 hours after all materials have been mixed.

All reactions should be run by technically qualified persons familiar with the potential hazards of the chemical reactions.

A Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

B The material should be ignited in the presence of sodium carbonate and slaked lime (calcium hydroxide). The substance should be mixed with vermiculite and then with the dry caustics, wrapped in paper and burned in a chemical incinerator equipped with an afterburner and scrubber.

C This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

D Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

E To a solution of the product in water, add an excess of dilute sulfuric acid. Let stand overnight. Remove any insolubles and bury in a landfill site approved for hazardous-waste disposal.

F Cautiously dissolve the material in water. Neutralize immediately with sodium carbonate or, if the material does not dissolve completely, add a little hydrochloric acid followed by sodium carbonate. Add calcium chloride in excess of the amount needed to precipitate the fluoride and/or carbonate. Separate the insolubles and bury in a landfill site approved for hazardous-waste disposal.

G Under an inert atmosphere, cautiously add the material to dry butanol in an appropriate solvent. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for venting of large volumes of highly flammable hydrogen and/or hydrocarbon gases. Neutralize the solution with aqueous acid. Filter off any solid residues for disposal as hazardous waste. Burn the liquid portion in a chemical incinerator equipped with an afterburner and scrubber.

H Neutralize the solution and add filtering agent (10g per 100ml). Evaporate the liquid and bag the residual solid for burial in a landfill site approved for hazardous-waste disposal.

I Dissolve the solid in (or dilute the solution with) a large volume of water. Carefully add a dilute solution of acetic acid or acetone to the mixture in a well ventilated area. Provisions should be made to vent safely the hydrogen gas given off during the decomposition. Check acidity of the solution and adjust to pH 1 if necessary. Let stand overnight. Neutralize the solution (pH 7). Evaporate the solution and bury the residue in a landfill site approved for hazardous-waste disposal.

J Cautiously acidify a 3% solution or a suspension of the material to pH 2 with sulfuric acid. Gradually add a 50% excess of aqueous sodium bisulfite with stirring at room temperature. An increase in temperature indicates that a reaction is taking place. If no reaction is observed on the addition of 10% of the sodium bisulfite solution, initiate it by cautiously adding more acid. If manganese, chromium, or molybdenum is present, adjust the pH of the solution to 7 and treat with sulfide to precipitate for burial as hazardous waste. Destroy excess sulfide, neutralize and flush solution down the drain.

K Please contact the Technical Services Department. Be sure to mention name, catalog number and quantity of the material.

L The material should be dissolved in 1) water; 2) acid solution or 3) oxidized to a water-soluble state. Precipitate the material as the sulfide, adjusting the pH of the solution to 7 to complete precipitation. Filter the insolubles and dispose of them in a hazardous-waste site. Destroy any excess sulfide with sodium hypochlorite. Neutralize the solution before flushing down the drain.

M A slurry of the arenediazonium salt with water can be disposed of by adding it gradually to a stirred solution of 5-10% excess 2-naphthol in 3% aqueous sodium hydroxide at 0-20°C. After 12 hours, the resulting azo dye is filtered and either incinerated or buried in a landfill site approved for hazardous-waste disposal. Neutralize the remaining solution before disposal.

N For small quantities: cautiously add to a large stirred excess of water. Adust the pH to neutral, separate any insoluble solids or liquids and package them for hazardous-waste disposal. Flush the aqueous solution down the drain with plenty of water. The hydrolysis and neutralization reactions may generate heat and fumes which can be controlled by the rate of addition.

O Bury in a landfill site approved for the disposal of chemical and hazardous waste.

P Material in the elemental state should be recovered for reuse or recycling.

Q Cautiously make a 5% solution of the material in water or dilute acid. There may be a vigorous, exothermic reaction and fumes may be generated due to the hydrolysis of the material. Control any reaction by cooling and by the rate of addition of the material. Gradually add dilute ammonium hydroxide to pH 10. Filter off any precipitate for disposal in a chemical landfill. If there is no precipitation, gradually adjust the pH from 10 to 6, stopping when precipitation occurs.

R Catalysts and expensive metals should be recovered for reuse or recycling.

S Treat a dilute basic solution (pH 10-11) of the material with a 50% excess of commercial laundry bleach. Control the temperature by the addition rate of bleach and adjust pH if necessary. Let stand overnight. Cautiously adjust solution to pH 7. Vigorous evolution of gas may occur. Filter any solids for burial in a chemical landfill. Precipitate any heavy metals by addition of sulfide and isolate for burial. Additional equivalents of hypochlorite may be needed if the metal can be oxidized to a higher valence state. For metal carbonyls, the reaction should be carried out under nitrogen.

T Cautiously make a 5% solution of the product in water; vent because of possible vigorous evolution of flammable hydrogen gas. Acidify the solution to pH 1 by adding 1*M* sulfuric acid dropwise. Acidification will cause vigorous evolution of hydrogen gas. Allow the solution to stand overnight. Evaporate the solution to dryness and bury the residue in a landfill site approved for hazardous-waste disposal.

U Take the material (or a solution) and make a 5% solution in tetrahydrofuran. Cautiously add the solution dropwise to an ice-cooled, stirred basic solution of commercial bleach. Oxidation may release flammable hydrocarbon gases which must be vented. Let stand overnight. Adjust the pH to 7 and destroy excess hypochlorite with sodium bisulfite before disposal of the solution.

V Under an inert atmosphere cautiously add dry butanol or a mixture of dry butanol in an appropriate solvent, to a solution of the material in tetrahydrofuran. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for the venting of a large volume of flammable hydrogen gas. When gas evolution ceases, cautiously add a basic hypochlorite solution dropwise to the reaction solution. Let stand overnight. Neutralize the solution and treat with sodium bisulfite to destroy any excess hypochlorite. Filter any solids for burial in a landfill site approved for hazardous-waste disposal.

THE SIGMA-ALDRICH LIBRARY OF CHEMICAL SAFETY DATA

Explanation of Codes

PROCEDURES FOR SPILLS OR LEAKS

1 Absorb on sand or vermiculite and place in closed container for disposal.
2 Cover with dry lime, sand, or soda ash. Place in covered containers using nonsparking tools and transport outdoors.
3 Shut off all sources of ignition.
4 Evacuate area.
5 Cover with an activated carbon adsorbent, take up and place in closed container. Transport outdoors.
6 Ventilate area and wash spill site after material pickup is complete.
7 Sweep up, place in a bag and hold for waste disposal.
8 Avoid raising dust.
9 Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
10 Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves.
11 Cover with dry lime or soda ash, pick up, keep in a closed container and hold for waste disposal.
12 Carefully sweep up and remove.
13 Flush spill area with copious amounts of water.
14 Mix with solid sodium bicarbonate.
15 Place in appropriate container.
16 Wear protective equipment.
17 Wash spill site with soap solution.
18 Please contact the Technical Services Department. Be sure to mention the name and catalog number of the material.

FIRE-EXTINGUISHING MEDIA

1 Carbon dioxide.
2 Dry chemical powder.
3 Water spray.
4 Alcohol or polymer foam.
5 Class D fire-extinguishing material only.
6 Water may be effective for cooling, but may not effect extinguishment.
7 Carbon dioxide, dry chemical powder, alcohol or polymer foam.
8 Foam and water spray are effective but may cause frothing.
9 Do not use dry chemical powder extinguisher on this material.
10 Do not use carbon dioxide extinguisher on this material.
11 Noncombustible.
12 Do not use water.
13 Use extinguishing media appropriate to surrounding fire conditions

Z14,866-0

Sigma-Aldrich Corporation, P.O. Box 355, Milwaukee, Wisconsin 53201 USA
(Sigma: 314-771-5765; Aldrich: 414-273-3850)

SITE DOSIMETER LOG

PROJECT/PAN # FT1305/F0HC0021XB SITE NAME Diamond Shamrock

SITE SAFETY OFFICER Reyes WEEK OF 6-25-91 - 6-27-91

NAME AND DOSIM. #	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Reyes	297						
Marcereau	338						
Russell	234						
Imes	330						
CHRISTENSEN	353						
PHILLIPS MIKE	236						

To the nearest half-hour, record time spent downrange as "S" (e.g., S:2.5hrs), time spent in active FDS operation as "P", and any time spent downrange in rescue activity as "R".

HS005(2/24/89)

Warehouse Phone (312) 775-7763 F. EQUIPMENT CHECKLIST Job/PAN FOH0021XB

Team Leader Jennelle Marcereau

PROTECTIVE GEAR

Level A	No.
SCBA	
SPARE AIR TANKS	
ENCAPSULATING SUIT (Type _____)	
SURGICAL GLOVES (Latex)	
NEOPRENE SAFETY BOOTS	
BOOTIES (Latex)	
GLOVES: Type _____ SM _____ M _____ L _____	
OUTER WORK GLOVES	
CASCADE SYSTEM	
5-MINUTE ESCAPE MASK	
COOLING VEST	
HARD HAT	
Level C	
ULTRA-TWIN RESPIRATOR	~~2~~ 6
POWER AIR PURIFYING RESPIRATOR	—
CARTRIDGES (Type GMC-H)	3 Boxes
PROTECTIVE COVERALL: Type SARANEX SM _____ M 8 L 8	16
BUTYL APRON	—
SURGICAL GLOVES (LATEX)	2 Boxes
GLOVES: Type Silver Shields SM 25 M _____ L _____	25
OUTER WORK GLOVES	2
GLOVE LINERS _____	
FACE SHIELD	
HARDHAT	7
RAIN SUIT	~~2~~ 6
NEOPRENE SAFETY BOOTS	—
BOOTIES (LATEX)	20
STEEL TOED BOOTS	~~2~~ 6

Level B	No.
SCBA	~~2~~ 6
SPARE AIR TANKS	~~2~~ 6
PROTECTIVE COVERALL: Type _____ SM _____ M _____ L _____	
BUTYL APRON	
SURGICAL GLOVES (LATEX)	
GLOVES: Type _____ SM _____ M _____ L _____	
NEOPRENE SAFETY BOOTS	
BOOTIES (LATEX)	
HARD HAT	
FACE SHIELD	
MANIFOLD SYSTEM WITH AIRLINE	
CASCADE SYSTEM	
RAIN SUIT	
OUTER WORK GLOVES	
Level D	
ULTRA-TWIN RESPIRATOR (Available)	~~2~~ 6
CARTRIDGES (Type GMC-H)	3 Boxes
5-MINUTE ESCAPE MASK (Available)	2
PROTECTIVE COVERALL: Type TYVEK + SARANEX SM _____ M 8 L 8	16
OUTER WORK GLOVES Silvershield	25
HARD HAT	~~2~~ 6
FACE SHIELD	
RAIN SUIT	~~2~~ 6
WINTER BOOTS	—
BOOTIES (LATEX)	20
NEOPRENE SAFETY BOOTS	—
STEEL TOED BOOTS	~~2~~ 6
SAFETY GLASSES	~~2~~ 6

FOR BOTH C and D

RS018D(05/30/89)

SARANEX WILL BE WORN FOR SEDIMENT SAMPLING

INSTRUMENTATION	No.
OVA	1
THERMAL DESORBER	
O2/EXPLOSIMETER W/CAL. KIT	1 each
PHOTOVAC TIP	
HNu (Probe (10.2) OR 11.7)	1
MAGNETOMETER	
PIPE LOCATOR	
WEATHER STATION	
DRAEGER PUMP, TUBES HCN	1
BRUNTON COMPASS	
MONITOX CYANIDE	1
HEAT STRESS MONITOR	
NOISE EQUIPMENT	
PERSONAL SAMPLING PUMPS (Type)	
DUST MONITOR (MDA OR GCA System)	
RADIATION EQUIPMENT	
TLD BADGES	6
DOCUMENTATION FORMS	
PORTABLE RATEMETER	
SCALER/RATEMETER	
NaI Probe	
ZnS Probe	
GM Pancake Probe	
GM Side Window Probe	
MICRO R METER (RAD-MINI)	1
ION CHAMBER	
ALERT DOSIMETER	
POCKET DOSIMETER	
FIRST AID EQUIPMENT	
FIRST AID KIT	1
OXYGEN ADMINISTRATOR	
STRETCHER	
PORTABLE EYE WASH	1
BLOOD PRESSURE MONITOR	
FIRE EXTINGUISHER	1 in each vehicle

OR

DECON EQUIPMENT	No.
WASH TUBS	2
BUCKETS	2
SCRUB BRUSHES	2
PRESSURIZED SPRAYER	
DETERGENT (Type ALCONOX)	1 bttle
SOLVENT (Type)	
PLASTIC SHEETING	1 roll
TARPS AND POLES	
TRASH BAGS	2 boxes
TRASH CANS	
MASKING TAPE	2 rolls
DUCT TAPE	2 rolls
PAPER TOWELS	5 rolls
FACE MASK SANITIZER	
FOLDING CHAIRS	2
STEP LADDERS	
DISTILLED WATER	✓
SAMPLING EQUIPMENT	
80 OZ. AMBER GLASS BOTTLES	
1 L. AMBER GLASS BOTTLES	
40 ML. VIALS	
1 L. PLASTIC	
8 OZ. GLASS	80
120 ML. GLASS	80
SPOONS	5
KNIVES	
FILTER PAPER	
PERSONAL SAMPLING PUMP SUPPLIES	
BUCK CALIBRATOR	
HAND BAILERS	
THIEVING RODS WITH BULBS	
DIOXIN SAMPLE KIT	
PRESERVATIVES: HNO3 NaOH Other	
STRING	

RS018D(05/30/89)

VAN EQUIPMENT	No.
TOOL KIT	1
HYDRAULIC JACK	1
LUG WRENCH	1
TOW CHAIN	
VAN CHECK OUT	
Gas	
Oil	
Antifreeze	
Battery	
Windshield Wash	
Tire Pressure	
MISCELLANEOUS	
CHALK	
LEVEL/TRIPOD AND ROD	
BOWLS + TROWELS	5
PITCHER PUMP	
SURVEYOR'S TAPE	
100 FIBERGLASS TAPE	
300 NYLON ROPE	1
NYLON STRING	
SURVEYING FLAGS	YES
FILM	3
WHEEL BARROW	
BUNG WRENCH	
SOIL AUGER W/ EXTENSION	1
PICK	
SHOVEL	1
CATALITIC HEATER	
PROPANE GAS	
BARRIER TAPE	
SURVEYING METER STICK	
CHAINING PINS & RING	
TABLES	
WEATHER RADIO	
BINOCULARS	
MEGAPHONE	

MISCELLANEOUS (Cont.)	No.
HEARING PROTECTION	
LIFE VESTS	
WALKIE-TALKIE	
CONDUCTIVITY METER	
PH METER	
CAMERA	1
WATER-LEVEL INDICATOR	
SPLIT SPOON SAMPLERS	
PVC HAND PUMP	
RESISTIVITY METER	
WELL POINT SAMPLER	
ROBAIR PUMP SYSTEM	
THERMOMETER	
MASTERFLEX PUMP & FILTER APPARATUS	
SHIPPING EQUIPMENT	✓
COOLERS	10
PAINT CANS WITH LIDS, 7 CLIPS EACH	
VERMICULITE	10
DUST MASK	2
SHIPPING LABELS	✓
DOT LABELS: "DANGER"	✓
"UP"	✓
"INSIDE CONTAINER COMPLIES ..."	✓
"HAZARD GROUP"	✓
STRAPPING TAPE	5 rolls
BOTTLE LABELS	✓
BAGGIES	✓
CUSTODY SEALS	✓
CHAIN-OF-CUSTODY FORMS	✓
FEDERAL EXPRESS FORMS	✓
CLEAR PACKING TAPE	✓
~~+ Van~~	1
~~L Suburban~~	1
DREDGE	
BENONITE	2 bags

One copy for each day

Project: Diamond Shamrock   TDD/PAN: FOS - 9105-007 / FOH0021 XH

Date: 1 / 91   Time: ____   Job No.: FT1305

Address: ____

Specific Location: ____

Type of Work: extended site inspection ~~&~~ including 12 sediments from Grand River

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: ____

Chemical Hazards: ____

Radiation Hazards: ____

Physical Hazards: ____

Emergency Procedures: ____

Hospital/Clinic: LAKE COUNTY MEMORIAL   Telephone: (216) 354-2400

Hospital Address: 36000 Euclid Avenue   WILLOUGHBY, OHIO

Special Equipment: ____

Other: ____

Checklist

1. Emergency information reviewed? ____ and made familiar to all team members? ____
2. Route to nearest hospital driven? ____ and its location known to all team members? ____
3. Site safety plan readily available and its location known to all team members? ____

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held when site tasks and/or conditions change.

ATTENDEES
(Expand on back of sheet if necessary)

Name Printed	Signature
Kerry Reyes	
Jennelle Marcereau	
NATHAN RUSSELL	
SALLY IMES	
JAMES CHRISTENSEN	
MIKE PHILLIPS	

Meeting Conducted by: ____ (Print)   ____ (Signature)

____ (Site Safety Coordinator)   ____ (Team Leader)

333

ON-SITE SAFETY MEETING

one copy for each day

Project Diamond Shamrock TDD/Tes FOS-9105-007/FOH002 / XB

Date 1/91 Time _____ Job No. F-T1305

Address _____

Specific Location _____

Type of Work extended site inspection of including 12 sediments from Grand River

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Radiation Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital/Clinic LAKE COUNTY MEMORIAL Telephone (216) 354-2400

Hospital Address 36000 Euclid Avenue WILLOUGHBY, OHIO

Special Equipment _____

Other _____

Checklist

1. Emergency information reviewed? _____ and made familiar to all team members? _____
2. Route to nearest hospital driven? _____ and its location known to all team members? _____
3. Site safety plan readily available and its location known to all team members? _____

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held when site tasks and/or conditions change.

ATTENDEES

(Expand on back of sheet if necessary)

Name Printed	Signature
Kerry Reyes	
Jennelle Marcereau	
NATHAN RUSSELL	
SALLY IMES	
JAMES CHRISTENSEN	
MIKE PHILLIPS	

Meeting Conducted by: _____ (Print) _____ (Signature)

_____ (Site Safety Coordinator) _____ (Team Leader) SJJ

ECOLOGY AND ENVIRONMENT, INC. - CHICAGO

ON-SITE SAFETY LOG

Name: Diamond Shamrock PAM #/Job #: FOH0021 X B/ FT1305

Date: _____ Weather _____

	Equipment (Circle All Used)	ID#	Calibration/ Operation Check	Initials and Date	Background Readings	On-Site Readings
1.	OVA					
	HNu					
	Photovac Tip					
2.	O_2 Meter					
	Explosimeter					
	Combo Meter					
3.	Rad-Mini					
	Monitor 4					
4.	HCN Draeger					
	Monitox					
5.	Other:					

Attendees At Site: _____

Protective Clothing Worn: _____

Comments on Monitoring or Protective Clothing: _____

Team Leader Jennelle Marcereau _____
Name Signature/Date

Site Safety Officer Kerry Reyes _____
Name Signature/Date

Please submit original to Laura Evans, and a copy to the project file.

HSG18E(6/11/90)

ECOLOGY AND ENVIRONMENT, INC. - CHICAGO

ON-SITE SAFETY LOG

Name: Diamond Shamrock PAN #/Job #: FOH0021XB/FT1305

Date: _____ Weather _____

	Equipment (Circle All Used)	ID#	Calibration/ Operation Check	Initials and Date	Background Readings	On-Site Readings
1.	OVA					
	HNu					
	Photovac Tip					
2.	O_2 Meter					
	Explosimeter					
	Combo Meter					
3.	Rad-Mini					
	Monitor 4					
4.	HCN Draeger					
	Monitox					
5.	Other:					

Attendees At Site: _____

Protective Clothing Worn: _____

Comments on Monitoring or Protective Clothing: _____

Team Leader Jennelle Marcereau _____

Name Signature/Date

Site Safety Officer Kerry Reyes _____

Name Signature/Date

Please submit original to Laura Evans, and a copy to the project file.

HSG18E(6/11/90)

Vehicle Safety Checklist
Ecology & Environment, Inc.
Chicago Office

Date: _____ Time: _____ Odometer: _____

Vehicle Model: _____ Color: _____ License Plate No. _____

INTERIOR:
___ All Safety Belts-Proper Locking
___ Parking Brake

START ENGINE:
___ Oil Pressure
___ Instrument Panel (Warning Lights or Buzzers)
___ Horn
___ Windshield Wiper & Washer
___ Heater/Defroster
___ Mirrors
___ Steering (Loose)
___ Interior Lights
___ Emergency Flashers
___ Starts Properly

FRONT:
___ Headlights (Dim/Bright)
___ Turn Signals
___ Emergency Flashers

REAR:
___ Tail Lights
___ Brake Lights
___ Back up Lights
___ Turn Signals
___ Emergency Flashers

MECHANICAL OPERATION:
___ Engine (misses, knocks, etc.)
___ Check Oil
___ Water/Anti-freeze
___ Wiper Fluid
___ Brake Fluid

OUTSIDE:
___ Tires (properly inflated)
___ Gas Tank Cap

EMERGENCY EQUIPMENT:
___ Fire Extinguisher
___ First Aid Kit
___ Flags, Flares,
___ Spare tire (properly inflated)
___ Tire Changing Kit (jack, tools, etc.)

REMARKS:

_____
_____
_____
_____
_____
_____
_____
_____

TEAM MEMBER/OPERATOR: _____ / _____
(print name) signature

SITE NAME/ADDRESS: Diamond Shamrock

PAN/JOB NUMBER: FOH0021XC

RETURN OF VEHICLE TO DUTY STATION

Vehicle Cleanliness: _____

Remarks: _____
_____
_____
_____

Corrections Necessary: _____
_____

TEAM MEMBER/OPERATOR: _____ /
(print name) signature

Date: _____ **Time:** _____ **Odometer:** _____

9/88

Site name Diamond Shamrock
PAN FOH0021XB

EQUIPMENT FUNCTION

Were there any problems with site entry equipment? _____
If yes, please describe

Equipment Piece _____
Description of Problem _____
_____
_____
_____
_____

Reported to Warehouse:
Reported by _____
Reported to _____
Date _____

TO BE FILLED IN BY HEALTH AND SAFETY:

Follow-up Action _____
_____
_____
_____

Corrected by _____
Date _____